# ELECTRICAL REVIEW

## and WESTERN ELECTRICIAN with which is consolidated ELECTROCRAFT

VOL. LXV, No. 8. CHICAGO, SATURDAY, AUGUST 22, 1914. ISSUED WEEKLY.

COMPRISING

ELECTRICAL REVIEW WESTERN ELECTRICIAN ELECTROCRAFT

**ELECTRICAL REVIEW PUBLISHING COMPANY, INC.**

608 SOUTH DEARBORN STREET
CHICAGO

Charles W. Price, President and Treasurer.
A. A. Gray, General Manager. H. S. Tuthill, Business Manager.
C. W. Forbrich, Assistant Business Manager.

E. E. Wood . . . . . 13 Park Row, New York, N. Y.
Manager Eastern States.

J. B. McCarthy . . . . . Detroit, Mich.
Manager Middle States.

C. W. Forbrich . . . . . Chicago, Ill.
Manager Western States.

**ELECTRICAL REVIEW AND WESTERN ELECTRICIAN**

Charles W. Price.....Editor-in-Chief
A. A. Gray.....Managing Editor
Morton Githens Lloyd.....Technical Editor
F. H. Bernhard.....Associate Editor
Howard Ehrlich.....Associate Editor
Chester A. Gauss.....Assistant Editor

MEMBER
DO IT ELECTRICALLY

SUBSCRIPTIONS.

One Year, United States .....$3.00
One Year, Canada ..... 4.00
One Year, Foreign Countries ..... 6.00
Single Copy, 10 cents. Back one month, each.. .25

Entered as second-class matter, November 7, 1908, at the Post Office at Chicago, Ill., under the Act of March 3, 1879


CONTENTS.


EDITORIALS:
Conservative Public Opinion.....353
Radiotelegraphy in the European War.....354
Public Policy Advertising.....355

DEPARTMENTS:
Commercial Practice.....362
Electric Vehicle Data.....368
Electrical Construction.....369
National Association of Electrical Inspectors.....377
Public Service Commissions.....378
New Electrical and Mechanical Appliances.....388
Current Electrical News.....395

LEADING ARTICLES:
Electrical Equipment of New Dock at Hull.—By Our British Correspondent.....359
Public Policy.....362
The Toledo Publicity Campaign.....364
Electrical Features of the North American Building.—By Norman G. Meade.....369
A Pipe Ladder for Electrical Installations.—By Henry Brady.....370
Efficiency in the Electrical Contracting Business.....372

MISCELLANEOUS:
Directors' Meeting, American Institute of Electrical Engineers.....356
Land Secured for Another Large Chicago Edison Station.356
C. V. Hard.....357
Lightning Protection.....357
Employers' Liability in Texas.....358
American Electrochemical Society.....358
Tentative Program of Illuminating Engineering Society.358
Edison Electric Farm at Lexington Park.....366
Vedder Electric Company.....375
Among the Contractors.....376
California Association of Electrical Contractors and Dealers' Fifth Annual Convention.....380
Secretary of Interior Urges Immediate Development of Our Mineral and Water-Power Resources.....382
Electrical Papers Presented Before American Institute of Mining Engineers.....384
Committee Report on Unified Electricity Supply for London.....385
Exhibit of the Bureau of Mines at the Panama-Pacific Exposition.....385
Connecting and Similar Errors in Three-Phase Meters....386
City License Tax on Meters Declared Unconstitutional....387


Copyright, 1914, by the Electrical Review Publishing Company, Inc.

## CONSERVATIVE PUBLIC OPINION.

In a recent address before the New Jersey State Chamber of Commerce, Mr. F. A. Vanderlip, president of the National City Bank of New York, said: "It is the duty of business men to think deeply enough upon these problems so that their conclusions will stand the test of open discussion. It is the obligation of business men to make effective political contributions which will help to form a sound public opinion. Viewed in this larger sense I believe that nearly everything that business men have to complain of in the political tendencies of the day can be pretty directly traced to their own neglect of their political duties. I believe that such neglect has brought us to a point of gravest danger—danger that involves the very foundations of the present order. That there should have been such neglect is not an unnatural thing. The conduct of business requires a high specialization, a more complete specialization today with all its complexities and its keenness of competition than it ever before required. Specialists, whether they be business specialists or specialists of other kinds, are apt to be so wrapped in their own environment that they are unable to generalize. They are obtuse, concerning matters outside of their specialty, and are unable to detect the course of the larger currents of affairs. That is one reason why business men are not more widely awake to the true significance of the drift of political currents. I firmly believe that if this nation is to avoid disaster a general awakening is necessary. We must recognize the probable effect of present-day political tendencies upon business, upon property and upon property rights, and upon the course of industrial and commercial development. I believe that currents are developing today that may really become irresistible forces, and that, too, forces of adversity and ill fortune if their dangers are not comprehended, their direction corrected and their source controlled."

This, from a banker and business man whose commercial existence depends upon an intimate knowledge of the ramifications of a great many lines of business; whose success in life depends upon an intelligent analysis of the needs of business and upon a proper estimate of the intelligence and integrity of men conducting many lines of business.

Discuss with the average business man any of the leading questions of the day. To what extent does his knowledge of the import of practically any question extend? Keen in his own line of business, susceptible to a quick understanding of matters which bear of easy explanation, he has been willing to take his information in tab-

loid form and by hearsay, and he has failed lamentably as a student of economics outside of his own business environment.

Nowhere is the average business man's conception of the import of things that are stirring us today better exemplified than in his attitude of apparent indifference to the probable effects of impending legislation with regard to the regulation of business. He knows that somebody is trying to do something. He has a pretty good idea that there is going to be trouble enough to go around. He feels, however, that it is somebody else's business that is being attacked and he closes in tighter to his own lines of endeavor and buckles down harder to his narrow groove and lets it go at that. Outside of the effort of the Chamber of Commerce of the United States of America to memorialize Congress with respect to the unjust discrimination in the proposed Sundry Civil Bill and the Clayton Omnibus Bill, what has the business man of the country done? Here is a measure contained in the Sundry Civil Appropriation Bill: "Enforcement of antitrust laws: For the enforcement of antitrust laws, including not exceeding $10,000 for salaries of necessary employees at the seat of government, $300,000: Provided, however, That no part of this money shall be spent in the prosecution of any organization or individual for entering into any combination or agreement having in view the increasing of wages, shortening of hours or bettering the conditions of labor, or for any act done in furtherance thereof, not in itself unlawful: Provided, further, That no part of this appropriation shall be expended for the prosecution of producers of farm products and association of farmers who co-operate and organize in an effort to and for the purpose to obtain and maintain a fair and reasonable price for their products."

This bill has already passed the House and the Senate, and is now in conference and undoubtedly will go to the president for his signature, and although he has publicly expressed himself as opposed to this measure as class legislation, he also confesses his inability to deal with it as a separate issue. What is the business man going to do about it? If there is no constructive public opinion to weigh the effects of the ultimate possibilities of legislation of this character, to what end may ambition run and where will be the incentive for individual effort? Is not the present tendency to level the results, to make the courageous work with less courage, to make the persistent persist to no result, to develop endurance and hardihood that those who do not develop these attributes may all come under the wire? It is as if those who had demonstrated agility and ability were not only put on scratch so that other less favored opponents might have a fairly equal issue, but it seems as though there should be hobbles added to the distance handicap.

Of what avail is the ability to organize for better conditions of labor, for higher wages and for larger prices for agricultural products if disaster to capital and crippling and discouragement of directive ability shall render the labor market untenable and shall leave us without the wherewithal to purchase the material which through organization may be increased in price? What will be the effect of disheartening the men of enterprise, upon the strength and resources of whom not only their own immediate families but the families of every employee they set to work depend?

Why is it that measures of this kind can get so far that they are in imminent danger of becoming the law of the land? It is because the business man has not taken the time to study the conditions surrounding him. When there has been an exposition of bad business, when there has been a wave of indignation as the result of extortion and manipulation, he has condemned the offense, realized that a certain portion of the stigma has been his to endure, but he has not fought back and proved that the whole business fabric was not entirely bad.

If business is to be rescued from the slough into which the academicians are striving to cast it we must have business men in our legislative councils. It is undoubtedly true that in establishing conditions for experimentation, in evolving theories to discountenance established precedents and blaze the trail for a new idea in business management, the student of social economics may think of things that the business man, wrapped up in his own proposition, may not have considered. It is a dangerous proposition, however, to have the conduct of business and the fate of the laboring men of the country in the hands of men who never met a payroll. There have been unequitable relations established; there have been examples of greed in corporate management and in the exaction of tolls along the line of taking what the traffic would bear. The retributive methods advocated so ardently by many of our so-called leaders in legislation today, however, are unnecessary and will accomplish only greater hardships for those they seek to protect. In one way or the other the business man must take a more direct responsibility in the formulation of the politics of his city, state and nation. He must co-operate with his fellow business men in chambers of commerce and in manufacturers' associations wherever they are established. He must learn to create and formulate a healthy constructive public opinion. If he doesn't do this now before those who do not know anything about his business get him neck and crop, he will have to do it after they put him out of business, in order that he may so arrange conditions that he will be able finally to get back and stay in the thing he is best fitted for—business.

## RADIOTELEGRAPHY IN THE EUROPEAN WAR.

When the history of the present great conflict in Europe appears on the pages of military engineers' journals for discussion by professional societies there is no question that the use of radiotelegraphy on land, in air, and on sea will occupy a large amount of space. As far back as the Russo-Japanese War the wireless played a vital part in the campaigns, but the increase

in the number of stations and vessels equipped since 1905 and the progress and experience attained in peaceful applications of this interesting branch of electrical service inevitably lead one to the conclusion that the radio engineer will be a more potent factor in the deplorable struggle now under way than in any other conflict in the history of the world.

The number and range of wireless stations in the war zone is amazing to one who has not kept in close touch with this line of development. In Austria-Hungary there are four important governmental plants; in Germany, seventeen; in France, eighteen; in Russia, twenty-eight; and in Great Britain, sixty-eight, or a total of 135 installations with known ranges of from 20 to 1,000 miles or more. It is no exaggeration to state that thousands of vessels are now equipped with radio plants, and many of these work through distances of 250 miles by day and often 500 miles or more by night. On the west coast of the north Atlantic Ocean at least 52 public stations are in operation between latitude 55 on the coast of Labrador and latitude 7 in South America. There is little more privacy, therefore, in sending an uncodified wireless message in the north Atlantic or from the principal European coastal stations than in the use of a megaphone to transmit orders to a football team in the midst of a crowded stadium, and the radii of transmission and reception develop some exceedingly interesting overlapping circular intersections when drawn to scale on a map of the European continent.

It takes little imagination to see the usefulness of radio service on the field, in the air, and on the waters of the deep at such a time, provided interference can be kept down. As for censorship, the more powerful shore stations can be closely supervised by governmental agencies, but the use of wireless on ships for sending message up to from 250 to 500 miles and receiving them from much greater distances from land stations will be subject to interference only by belligerents. Just how far it is wise to attempt to limit the activities of shore stations in a neutral land is a question. At the Hague conference in 1907 a rule prohibiting the erection by belligerents of a radio station in neutral territory during war time grew out of the Russo-Japanese conflict, with the further prohibition of using any station established before the war solely for government dispatches. To avoid any doubt as to the extent of the prohibition a further article provided that "A neutral power is not called upon to forbid or restrict the use on behalf of the belligerents of telephone or telegraph cables or of wireless telegraphy apparatus belonging to it, or to companies or private individuals." That is, no neutral nation is obliged to forbid the use of an ordinary commercial station for governmental communications. It will be interesting to watch the development of our governmental policy in this connection, for the problem of secrecy is anything but a simple one to solve, even by the parties most interested, and there should be no discrimination on the part of this country in attempting to maintain its neutrality in this as in other fields.

When one reflects that the dots and dashes flashed into space from the wireless cabin of a foreign cruiser in pursuit of a transatlantic liner impinge in staccato buzzing against the telephone receiver of the enterprising up-state New York farmer's boy, it is apparent that only the code saves the day for the time being, and that with the capture of this, not only may enemies anticipate each other's movements and story-hungry newspaper editors be "tipped off" as to thrilling events, but false orders may be issued to the discomfiture of flying merchantmen and the mystification of potent adversaries. And when the day finally dawns on which the embattled nations cease from troubling and the weary are at rest, it is the wireless whose tiny voice will be heard above the appalling thunder of modern artillery and whose compelling signals will still the madness in the breasts of men and hasten the coming of a peace which, it is to be hoped, will never again be so rudely disturbed as in the momentous times in which we are living today.

## PUBLIC POLICY ADVERTISING.

It was pointed out in these columns last week that the corporation policies of the past which had been responsible for the more or less antagonistic attitude of the public are now being happily discarded and today, in most communities, the attitude of straightforward dealing with the public has been adopted. The fight for a railway franchise in Toledo and the commendable position taken by Mr. Henry L. Doherty in meeting criticism face to face and striving for popular favor through simple appeals to the justice and reasoning ability of the public was cited as a noteworthy example of the modern tendency in this direction.

On other pages of this issue we reproduce an article by Mr. Thaddeus S. Dayton, describing the advertising carried on incident to this campaign, which should be suggestive to the increasing number of corporations which are showing a disposition to reach out for popular good will.

This advertising campaign in Toledo is said to have cost in the neighborhood of $10,000, and while the actual settlement of the situation has not been decided upon, it is the opinion of the officials of the company that the campaign has resulted in much good to the utility. Regardless of any action the local City Council may take in this franchise matter, it is evident to all who have followed the case that public opinion is on the side of the utility, proving conclusively the much quoted contention that when the people know the facts they can be relied upon to give even a corporation a square deal. Perhaps of greater interest to public utility operators, however, is the convincing demonstration of the great value of display advertising and constructive publicity for public service corporations. Undoubtedly newspaper advertising and publicity will have an important place in the future public policy activities and campaigns of public service corporations.

## Directors' Meeting, American Institute of Electrical Engineers.

The Board of Directors of the American Institute of Electrical Engineers held its first meeting for the new administrative year (which began August 1) in New York, on August 11. President Paul M. Lincoln, Pittsburgh, Pa., presided; thirteen other directors were present.

President Lincoln announced his appointments on the various Institute committees for the present administrative year. The chairmen of the committees appointed are: Finance, J. Franklin Stevens, Philadelphia, Pa.; Meetings and Papers, L. T. Robinson, Schenectady, N. Y.; Editing, H. H. Norris, New York City; Board of Examiners, Maurice Coster, New York; Sections, H. A. Hornor, Philadelphia; Standards, A. E. Kennelly, Cambridge, Mass.; United States National Committee, International Electrotechnical Commission, C. O. Mailloux, New York; Public Policy, Calvert Townley, New York; Library, Samuel Sheldon, Brooklyn, N. Y.; Code, Farley Osgood, Newark, N. J.; Relations of Consulting Engineers, L. B. Stillwell, New York; Historical Museum, T. C. Martin, New York; Membership, H. D. James, Pittsburgh, Pa.; Patents, Ralph D. Mershon, New York; Transmission, P. H. Thomas, New York; Railway, D. C. Jackson, Boston, Mass.; Electric Lighting, Clayton H. Sharp, New York; Industrial Power, D. B. Rushmore, Schenectady, N. Y.; Telegraphy and Telephony, C. E. Scribner, New York; Use of Electricity in Mines, Wilfred Sykes, Pittsburgh, Pa.; Use of Electricity in Marine Work, C. S. McDowell, Brooklyn, N. Y.; Electrochemical, A. F. Ganz, Hoboken, N. J.; Electrophysics, J. B. Whitehead, Baltimore, Md.; Educational, V. Karapetoff, Ithaca, N. Y. Representatives were also appointed on a number of joint committees and other bodies.

The Board elected from its own membership the following members to serve upon the Edison Medal Committee for two years to fill the places of members whose terms had expired: C. O. Mailloux, L. T. Robinson, Charles E. Scribner. A. S. McAllister was elected for the term of one year to fill a vacancy. The Board also confirmed the appointment by the president of the following members of the Edison Medal Committee for five years: Charles F. Brush, William Stanley, and N. F. Storer.

The following local honorary secretaries were reappointed for a term of two years: Robert Julian Scott, Christ Church, New Zealand; Henry Graftio, St. Petersburg, Russia; A. S. Garfield, Paris, France.

At his request, the president was authorized to appoint a new committee on the use of electricity in the iron and steel industry, in order that the Institute could provide for its members interested in this important branch of electrical engineering adequate opportunity for the presentation of papers and discussions relating to the subject. The appointment of this committee will be announced later.

The action of the Finance Committee in approving for payment monthly bills amounting to $6,859.73 was ratified.

The report of the Board of Examiners of its meeting held on August 6 was accepted and the actions taken by this board were approved. Upon the recommendation of the Board of Examiners the following action was taken upon pending applications for election and transfer: 37 applicants were elected as associates; six students were ordered enrolled. There were elected to the grade of member: Henry L. Gray, Seattle, Wash.; A. H. Moore, Schenectady, N. Y.; O. O. Rider, Chicago, Ill. There were transferred to the grade of member: James R. Bibbins, Chicago, Ill.; Charles E. Davies, Ottawa, Ont.; Richard H. Dearborn, Eugene, Ore.; Clarence S. Hull, San Francisco, Cal.; Sherwood C. Lindsay, Seattle, Wash. Transferred to the grade of fellow: Francis M. Hartmann, New York; C. T. Henderson, Milwaukee, Wis.; Alfred Still, La Fayette, Ind.; Wilfred Sykes, Pittsburgh, Pa.; Charles R. Underhill, New Haven, Conn.; James W. Welsh, Pittsburgh, Pa.

Upon the request of the Philadelphia Section and the recommendation of the Meetings and Papers Committee an Institute meeting was authorized to be held in Philadelphia, Pa., on October 12, 1914.

Upon the recommendation of the section delegates present at the recent Detroit convention, Section 60 of the Institute by-laws, fixing the amount of financial support to which each section is entitled from the Institute, was amended so as to increase the amount available for the work of each section by fifty dollars. Under the by-law the amount available previously was determined as follows: (a) fifty dollars for each section regardless of the number of members in its territory; (b) one dollar and a quarter for each member within a section's territory 60 miles from its headquarters. The amendment increased the flat appropriation (a) of fifty dollars for each section to one hundred dollars. This action was taken chiefly for the benefit of the smaller sections whose membership is not sufficient to provide adequate funds to meet the expenses of holding meetings.

## Land Secured for Another Large Chicago Edison Station.

The purchase by the Commonwealth Edison Company of a 24-acre tract in the southeastern part of Chicago, known as South Chicago, was officially recorded on August 17. The land lies at One-Hundredth Street and Avenue N. It is close to the Calumet River and the trunk lines of the Pennsylvania, Lake Shore and Baltimore & Ohio railroads. The purchase price is said to have been about $300,000.

On account of its location near several railroads, newspapers declare that the power house to be erected in the future on the land will be used for supplying energy for the electrification of the railroads. Samuel Insull, president of the company, said: "The transaction is merely the recording of the property. We acquired the property two years ago and will use it to erect a plant to supply the manufacturing firms of South Chicago and Burnside with power. It is located at that point because fuel may be switched in easily and because there is plenty of water there. Water and fuel are necessary in the operation of a power plant. So far as the electrification of the railroads is concerned, I can say that we have no contracts with any roads for power to operate their trains. But of course the power house will be there if any railroads want to buy electricity."

Nothing definite has been announced by the company as to when this plant, which will be its fourth large station, will be erected. It may exceed the other plants in size, because of rapidly growing industrial development of the district.

## New Orleans Garbage Incinerator May Be Used as Lighting Plant.

The New Orleans municipal authorities have decided to construct a garbage incinerator plant and are now studying the results obtained from high-temperature destructors in other cities. They are also considering the advisability of constructing a municipal lighting plant in connection with the incinerator. At present the garbage is disposed of by dumping outside the city.

Manufacturers of high-temperature incinerators and electric generating equipment should communicate with E. E. Lafaye, commissioner of public property, New Orleans, La.

## Municipal Ownership Defeated at Guthrie.

Although reputedly in favor of municipal ownership, the city of Guthrie, Okla., defeated at the polls on August 11 proposals to issue bonds not to exceed $500,000 to buy the electric light and power plant, $40,000 for water works, and to increase the tax levy to meet the bonds.

## C. V. Hard.

Colonel C. V. Hard, recently elected president of the Ohio Electric Light Association, is one of the most representative public-utility men in the country. During nearly all his life he has been engaged in the banking business, combining a great experience in financial affairs with a mastery of the details of central-station operation and the execution of vigorous and enterprising policies in the commercial departments of central-station work. Colonel Hard was born in Wooster, O., in 1845. Except during the period of his army service he has lived in that city all his life. He was educated at Berea College, near Cleveland. Of an honored and patriotic ancestry, some of his forebears on both sides of his house having taken part in the Revolutionary struggle and in the war of 1812, Colonel Hard bore arms twice for his country—in the Civil War, as a member of the 135th Regiment of Ohio Volunteer Infantry and in the Spanish-American War as colonel of the Eighth Ohio. He served with distinction all through both conflicts and was present at the surrender of Santiago. He engaged in active service all through the campaign in Cuba, and his regiment was in Shafter's corps during the entire time of the war.

The first contract for lighting the streets of Wooster, O., was made with the City Council on May 20, 1886, by Charles E. Dustin, of Middletown, Conn., J. R. Adams, of St. Louis, Walter Mullins, of Wooster, and Colonel Hard. The company was originally organized June 16, 1886, by these gentlemen and John C. Talbot, representing Edward M. Quimby, the name of the company being the Wooster-Schuyler Electric Company, with Charles E. Adams president and Colonel Hard treasurer. He became president of the company in 1909, owning nearly all of the capital stock. In 1904 he and his son organized the Cleveland Light & Power Company and own and operate that company at the present time.

Colonel C. V. Hard,
President, Ohio Electric Light Association.

## Lightning Protection.

An interesting study of lightning discharges and the effect of lightning-conductor systems is contained in a paper recently read before the Royal Society by Sir Joseph Larmor and J. S. B. Larmor. According to the abstract of the paper in *Electrical Engineering*, of London, the authors investigate the nature of the lightning discharge and conceive of the flash commencing at some point in the field where, owing to the displacement of charged masses of the wind and by their mutual attractions, the limit of dielectric strength is reached, when a breakdown occurs and the disruption spreads along the line of force both backward and forward from this point of most intense force. In the case of a lightning rod they believe that the discharge starts at the summit of the rod, which is the point of most intense strain, and really strikes away from the rod and not towards it. The zigzag character of many flashes is due to the fact that the discharge profoundly alters the fields of force between the clouds and neighboring masses, thus inciting immediate new discharges. Something of this kind is indicated by the discontinuous crackle of a sharp discharge. When once an ionized path is opened up, there is a strong tendency for subsequent discharges to take place along it. Sometimes this path is blown into a new position by the wind, which may account for the frequently photographed parallel flashes.

The authors investigate the region of protection of a lightning rod by considering the modification of the field of force due to its influence. As a general principle it is the building to which the rod is attached that modifies the field and draws the charge by virtue of its conducting materials on account of its breadth being substantial compared to its height. The structure protects the region around its base by directing discharge to its own copper parts, which therefore need protection by conductors adequate to draw off the discharge to earth and vertical rods joined together if need be lower down, but rising from the corners of the structure to a height which need not be more than about half its breadth. The rods may rise from a network spread over the roof, and their essential feature appears to be their lifting the field of intenser force to the region in which their free ends are immersed. A lightning rod is most effective when it lies along the lines of force.

## Consolidation of Utah Utilities Possible.

Credence is given to the persistent rumors in Salt Lake City, Utah, that the Utah Power & Light Co. is considering the purchase of the Utah Light & Railway Company by the presence in Salt Lake City of a corps of accounting experts who are going over the books of the latter company. Judge Robert S. Lovett, chairman of the Board of Directors of the Union Pacific system, which controls the Utah Light & Railway Company, has this to say:

"I always refuse to say yes or no to questions concerning the company's negotiations. It is soon enough for me to talk about them after they have been consummated. Such rumors cannot be always honestly denied and it is not good policy to confirm them, and to get around the situation I always refuse to talk about them."

The Harriman system purchased control of the Utah Light & Railway Company eight years ago for a consideration of approximately $3,000,000 and has spent since that time approximately $7,000,000 on the system. The company furnishes the entire electric-lighting and street-railway service in Salt Lake City and the majority of the lighting and power service of Ogden. The acquiring of this property by the Utah Power & Light Company would give it virtual control of all electric light and power systems in the state.

## Employers' Liability in Texas.

The State Industrial Accident Board, Austin, Tex., has issued a set of rules to govern the employers and the employees who come within the scope of the Employers' Liability Act that was passed by the last Legislature in Texas

The State Industrial Accident Board has received the following inquiry:

"A concern operates an electric light plant and a street railway. The one corporation operates both plants, and the labor is interchangeable to a certain extent. Will the employees of this concern be considered as operating under the Employers' Liability Act?"

A reply was made to this question as follows:

"If the electric light plant be used solely and exclusively for the operation of the street-railway company, and is owned by the same party or parties, the plant and railway will constitute a single business, which is excepted from the Employers' Liability Act; but, if the electric light plant be used for other purposes as well as for furnishing power to the street railway, then such of its employees as are not connected with the street railway may be brought within the Employers' Liability Act. It will be a question of fact, however, where an employee has suffered an accident while working for the electric light plant whether such accident be attributable to service for the railway company or for the electric light plant in connection with its other services. A street-railway company is excepted from the Act, but it does not necessarily follow that the plant which furnished the power is also excepted, when it is serving other purposes as well."

## American Electrochemical Society.

The twenty-sixth general meeting of the American Electrochemical Society will be held at the Clifton Hotel, Niagara Falls, Ont., from October 1 to October 3, inclusive. The following papers that will be presented have already been printed and distributed among the members.

"The Evaporator and the Power Problem in Electrochemical Plants," by Otto Mantins; "On Electrometric Titrations," by Henry Ziegel; "The Sources of Impurities in Cathode Copper," by Lawrence Addicks; "The Constancy of Base-Metal Thermocouples as Related to the Microstructure," by O. L. Kowalke; "The Reproducibility of the Copper Electrodes," by Frederick H. Getman; "The Electrolytic Determination of Nickel," by W. Judson March.

Other papers are in the hands of the Publication Committee, which is aiming to have as far as possible advance distribution of the papers in order to elicit much well considered discussion of them.

A feature of the meeting will be an experimental symposium on "The Practical Side of Electrochemical Investigation," occupying two sessions on October 3, and consisting of a number of demonstrations of methods and apparatus. Promises of participation have already been secured from Research Laboratory of the General Electric Company, Research Laboratory of the Westinghouse Electric & Manufacturing Company, F. A. J. FitzGerald, L. E. Saunders, A. T. Hinckley, Max Mauran, Carl Herring and Lynn Bradley, and others are expected. The symposium will be held in the Fitz-Gerald laboratories, where the excellent facilities available will permit a display of extreme interest and of very diversified character.

A number of special entertainment features have been provided as follows. For the afternoon of October 1, excursion to Foster's Flats in the Niagara Gorge. This will be followed in the evening by a smoker. On the following morning there will be inspection visits to electrochemical plants and power houses on both the Canadian and American sides of the Falls. On the evening of October 2 will be given a subscription dinner followed by an experimental lecture. On the evening of the closing day there will be a "Kommers" at the Niagara Club or the Fort Schlosser Club.

## Los Angeles Telephone Rates in Controversy.

The Pacific Telephone & Telegraph Company and the Home Telegraph & Telephone Company, the two telephone companies operating in Los Angeles, Cal., have secured injunction against the putting in effect of a new schedule of telephone rates by the city of Los Angeles.

The Home company asserted that the return on its investment under the new rates would be but two-per-cent on its appraised valuation of $9,417,779 and the Pacific company asserted that its loss under the new rates would have been $59,000 last year and for the current year would be not less than $86,000.

Injunctions were issued and the companies and the city got together on a new schedule of rates to be in effect until the injunction suits are finally decided, the new schedule raising the cost of business telephone $1 a month and residence telephones 25 cents a month. If the rates as finally determined are less than the rate to be charged during the pendency of the suits the companies will rebate the difference to their patrons.

## Tentative Program of Illuminating Engineering Society Convention.

The eighth annual convention of the Illuminating Engineering Society will be held at the Hotel Hollenden, Cleveland, O., from September 21 to 25, inclusive. Arrangements are now being completed for making this probably the largest convention ever held by the Society. W. M. Skiff is chairman of the Convention Committee.

The tentative program of papers to be presented at the convention is as follows:

"Factory Lighting," by O. R. Hogue and A. O. Dicker; "Some Experiments with the Ferree Test for Eye Fatigue," by J. R. Cravath; "Planning for Daylight and Sunlight in Buildings," by L. B. Marks and J. E. Woodwell; "Notes on the Ulbricht Integrating Sphere and Arc Lamp Photometry," by H. K. Chaney; "Effects of Room Dimensions on Efficiency of Lighting System," by Ward Harrison; "Relation of Light to the Critical Inspection of Documents," by A. S. Osborne; "Experiments with Colored Absorbing Solutions for Use in Heterochromatic Photometry," by H. E. Ives and E. F. Kingsbury; "A New Standard Light Source," by L. A. Jones; "Artificial Daylight—Its Production and Use," by M. Luckiesh and F. E. Cady; "Characteristics of Gas-Filled Lamps," by G. M. J. Mackay; "A Transmission and Absorbing Photometer for Small Areas," by P. G. Nutting and L. A. Jones; "Recent Improvement in Gas Lamps," by a representative of the Welsbach Company; "Illumination of Light Shafts," by C. H. Sharp; "Portable Mine Lamp," by H. H. Clark; "Some Recent Experiments on Vision of Animals," by H. M. Johnson; "Light Filters for Use in Photometry," by C. E. K. Moos; "The Locomotive Headlight," by J. L. Minick; "Present Practice in Machine-Shop Lighting," by A. L. Powell and R. E. Harrington; "The Development of Daylight Glass," by E. J. Brady; "Lighting of the Home," by a representative of the Duquesne Light Company; "Lighting of a Carpet Mill," by S. L. E. Rose and R. F. Ockley; "Physiological Effects of Light on the Body," by E. C. Titus. It is probable that one of the two following papers will be also selected: "Color Variation in Illuminants," and "Reflection Standards," by P. G. Nutting and L. A. Jones. A few other papers may also be added.

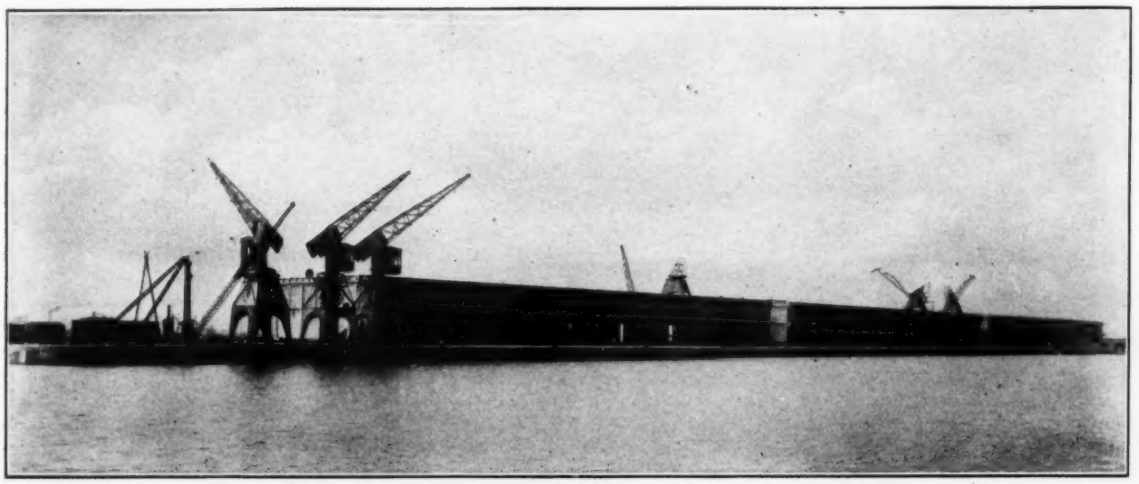
Elaborate arrangements are being made for entertainment. Included among these convention features will be a special visit to the extensive establishment of the National Lamp Works, at Nela Park.

# Electrical Equipment of New Dock at Hull.

By Our British Correspondent.

The electrical installation at the new Joint-Dock at Hull, England, is the latest and most extensive example of British electrical conveying, crane and like equipment. An idea of the magnitude of the complete dock undertaking may be gathered when it is stated that the dock has a water area of 53 acres with a total length of quay of 8,162 lineal feet; that it has cost $15,000,000 and has taken eight years to complete.

The dock is a joint undertaking of the North Eastern Railway and the Hull and Barrsley Railway, whose engineers—Messrs. T. M. Newell and R. Pawley—have followed the most enlightened practice and allowed electricity to have the freest possible play. The entire installation is modern, including electric coal conveyors, coal hoists, electric cranes, and there are extensive warehouses of ferro-concrete, a grain silo, grain handling plant, a floating crane for heavy lifts, electric pumping plant, etc. W. Ebdon has acted as resident engineer, and T. L. Norfolk has superintended the construction of the equipment.



*Copyright by the Photochrom Company, Ltd.*

General View of Hull Dock and Cranes from the Water Front.

Electric power is to be used for every purpose on the dock and no steam generating plant will be necessary. Electrical energy is being purchased from the Hull municipal electricity works at 440 volts direct current, and for distributing the current a most complete system of electric cables has been laid round the property for both power and lighting service. Hydraulic power will be used for operating the lock and dock gates, and for the hydraulic coal tips, and for this purpose electric pumps serve.

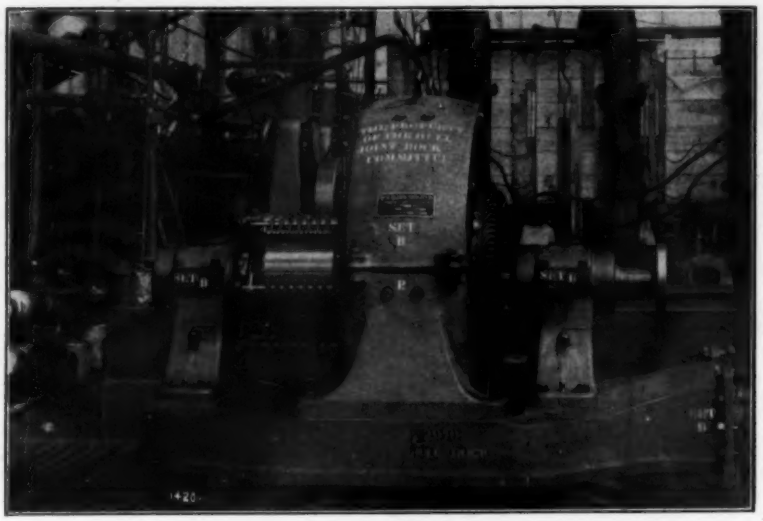
For the lighting of the dock there are about a hundred iron standards for incandescent electric lamps all fitted with suitable lowering and raising gear; lattice poles for pilot lights are placed at the dock entrance. There has also been a good deal of interior installation work connected with the lighting of the six ferro-concrete warehouses. These each measure 375 feet in length and have a floor space of 49,000 square yards. Three of them wired by Robson & Coleman have 400 lights each, mostly done on cleat insulators, the remainder being in screwed steel tubing. There are six service feeding points for these warehouses, and ironclad distribution boards, etc., are used.

For pumping out the new docks a complete electrical pumping equipment has been constructed by W. H. Allen Son and Company to the specification of the joint engineers for the undertaking. It consists of two main pumps and motors with switchgear, a drainage pump and charging pump with motors as well as pipework, valves and switchgear. The pumps are "Conqueror" centrifugal type, having suction and discharge branches 42 inches in diameter. Each pump discharges a mean quantity of 36,000 gallons of water per minute against a head of 40 feet. The pumps run at a speed of 375 to 416 revolutions per minute and each absorbs a maximum of 390 brake horsepower. Hydraulic sluice valves are fitted on the suction and discharge sides of the main pumps and so arranged that each main pump may draw water from either dock as required. Water-level indicators have been fitted to show the level of the water in the graving docks and outside the docks. The drainage pump has suction and discharge branches 14 inches in diameter, and it delivers 3,000 gallons of water per minute against a total suction and delivery head of 54 feet, the speed being 1,100 revolutions per minute. The horsepower absorbed by the pump under these conditions is 70 brake horsepower.

The main motors for the pumps are Allen open type, fitted with protective shields to prevent water dripping on the windings. Each motor develops a full load output of 420 brake horsepower, when running at 375/416 revolutions per minute and supplied with continuous current at 440 volts. The drainage pump motor is a semi-inclosed one and develops 75 brake horsepower at 1,100 revolutions per minute; the charging pump motor is of the same type and runs at 750 revolutions. For each of these motors a complete switchgear is provided, consisting of an inclosed ironclad pillar. Each pillar is equipped with a 420-horsepower 440-volt mutipolar lever starter consisting of a series of edgewise type switches. The starter is operated step by step by means of a slow motion ratchet-type handle which actuates a double-pole circuit-breaker of the magnetic blow-out type interlocking with the starter, so that the breaker can only be put on when the starter is "off," and so that the breaker

is tripped and cannot be put on again until the starter is returned to the "off" position in the event of the attendant failing to complete the operation of starting. The drainage and charging pump motors are also supplied with their own switchgear.

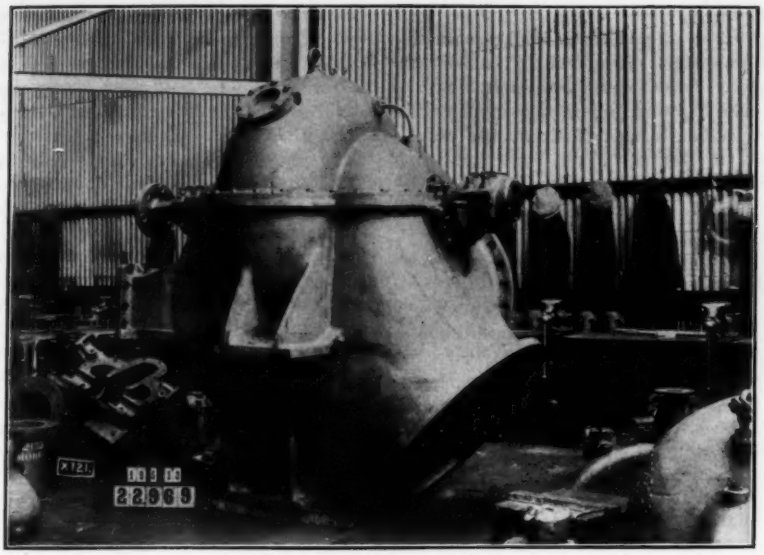
The 53 electric cranes range in lifting capacity from 1.5 tons to 80 tons the largest being a floating crane which can be moved to any part of the dock. Twenty-five of the cranes are by Royce Limited. One of them appears in an accompanying photograph. They are of the traveling gantry or portal type, and are placed on four of the quays; all of them are of three-tons capacity. They are fitted with Musker-Davidson patent luffing gear and the motions of hoisting, traveling, luffing and slewing are electrically driven. The maximum radius of the jib is 30 feet, minimum 20 feet, the luffing speed at the hook 150 feet per minute. The hoisting speed with 3 tons is 150 feet per minute, 1.5 tons, 250 feet per minute; slewing speed at hook 400 feet per minute, traveling speed 30 feet per minute. The height from the crane rails to the point of the jib at maximum radius is 80 feet. The electrical equipment is made for 440 volts direct current. The hoisting motor is of 45 horsepower, slewing motor 5 horsepower, and the luffing and traveling motors are each 8 horsepower. The Royce electrical gear is used throughout. The motors are of the totally inclosed type—six hours rating. The controllers are of the tramway type of robust construction to stand heavy usage. The traveling rail centers are 15 feet and the wheel base 19 feet. The traveling motion only is fitted with hand gear. Automatic electrical safeguards against over-running in either direction are provided for the hoisting and luffing motions. Each motion is fitted with an electrical brake and in the case of the hoisting motion a powerful foot brake is also provided on the barrel shaft and is used for quick lowering without current. In such circumstances the electrical brake is held off by a hand release device. The gear for the motions of hoisting, slewing and luffing is carried on a central revolving mast which is pivoted and supported at the foot in a cast-steel footstep bearing and at about the center of its length by a roller path. The special advantage of the luffing arrangements are that the load during luffing is not lifted as in the ordinary jib crane, but moves in a horizontal line and consequently a great saving of power is effected and a small motor only is required. Current is conveyed to the cranes through heavily armoured cable from plug boxes fixed at intervals along the quays and each crane is provided for this purpose with a revolving cable drum on one of the bottom carriages.



Motor for Driving Pump.

One of the Electric Cranes at Hull Joint Dock.

The remainder of the cranes include six of 1.5 tons capacity and nine of 10 tons capacity. The six smaller ones are carried on the tops of the warehouses on No. 3 and No. 1 quays. They are carried on tracks along the outer edge of the warehouse in each case, the tracks being 20 feet



Casing of Main Pump at Hull Dock.

7.5 inches between centers of rails, and these cranes serve through hatchways in the warehouse roofs and over rails and roadways on the ground level outside the warehouse. The cranes have hoisting, slewing, derricking and traveling motions each electrically driven by a separate motor. The nine 10-ton cranes are placed five on No. 3 quay and four on No. 1 quay, working on tracks alongside the edge of the quays. These cranes also are fitted with the Musker-Davidson luffing gear. Seven out of these nine cranes are fitted with Simon telescopic grain elevators which are carried by supplementary jibs at the back of the vertical post. When not in use the elevator jibs are derricked to the in position, raising the elevators and stowing them alongside the mast and the crane is then ready for the ordinary work of cargo handling, and similarly when the elevators are put into action the main jib is derricked up to the in position. Each elevator is capable of discharging 120 tons of bulk grain per hour, and it is driven by separate motor. Six berths are reserved for coaling purposes, each provided with coaling appliances, capable of dealing with 800 tons per hour. Five electric belt conveyors will each operate at this rate per hour.

A grain silo which is to have a storage capacity of 40,000 tons is under construction at the west end of the dock. It is being fitted with the most modern grain-handling plant for the quick delivery of grain from vessels to the silo or to barges. This equipment includes eight underground electric belt conveyors; speed of each, 120 tons per hour; there are two belts to each of four berths. There are also six portable elevators with weighers for discharge from ship to barge.

All the main feeder and distributor cables for power and lighting required in connection with these docks were manufactured and laid by Callender's Cable & Construction Company, Ltd. The power cables and also the lighting feeder cables are single-conductor, paper, lead-sheathed cables, laid on Callender's solid system two or three in a trough, the troughs being of hard burnt well glazed earthenware, rectangular in section, containing separate stoneware bridges on which the cables are supported. The troughs are then filled in with genuine refined Trinidad Bitumen, and covered with stout tiles. In certain cases, to meet the unstable nature of the soil, cast-iron troughs have been used, and where the main tracks of railways are crossed the cables are drawn through cast-iron pipes, which pipes terminate in a brick pit each side of the line. The distributor, and sub-circuits for lighting, consist of arc and incandescent single-conductor or multicore cables, these being paper insulated, lead sheathed and steel-wire armoured, laid direct in the ground.

Owing to the large area of the new docks, the cables are of considerable sectional area, the main feeder cables varying in section from one square inch to 1.6 square inch, and in most cases a considerable number of these cables are laid in parallel.

The chief power circuits consist of:

(a) Four 1.35-square-inch cables from the substation to the coal conveyor, a distance of about 2,700 yards.

(b) Two 1.5-square-inch cables from the substation to Quay No. 1, the length of this feeder being about 500 yards.

(c) Four one-square-inch cables from the substation to No. 3 Quay, the length of this feeder being about 650 yards.

(d) Four 1.65-inch cables from the substation to Quay No. 8, the route length being approximately 2,000 yards.

(e) Four 1.35-inch cables, from the substation to the hydraulic pumping house, route length being 1,800 yards.

(f) Six 1.6-inch cables, from the substation to the centrifugal pumping

*Copyright by the Photochrom Company, Ltd.*

Interior of One of the Warehouses Showing Wiring and Lighting Layout.

station, the route length being 2,300 yards.

The power feeders running to the centrifugal pumping station pass the hydraulic pumping station, and have been looped in to the hydraulic pumping station, so that any change over could be effected if this was found necessary.

The operation of the various circuits at the different feeding and sub-feeding points is effected at feeder pillars and distribution boxes, all of Callender's design, and in many cases specially arranged to meet the requirements of this particular contract. The whole of the branch boxes and plug boxes fitted for use with the cranes on the quays and on the warehouse roofs were also designed and manufactured by Callender's Company. The chief features of these designs are as follows:

The feeder pillars for power distribution are fitted with single-pole quick-break knife switches to control each of the two-wire circuits. The pillars each contain a positive and negative slate panel on which the switches are mounted, the switches in some cases being of a carrying capacity of 1,500 amperes. The incoming cables are sealed in the bases in right-angle dividing boxes from which cables are taken to the switch terminals.

The lighting pillars are of the Callender-Ward type, with double porcelain insulation, all the fittings being mounted on the separate porcelain-unit principle. They are arranged for three-wire distribution, the feeders being connected directly to the bus-bars, and the outers of the three-wire distributors connected through switch fuses. The incoming cables are sealed in separate dividing boxes from which rubber-insulated tails are taken to the switch fuse terminals.

The network boxes for both power and lighting are of the Callender "Mushroom" type in which the disconnecting links or fuses are mounted on separate "Mushroom" porcelains fixed independently to the bottom of the boxes and protruding through the sealing ground, thus preventing surface leakage. The outer boxes are two-wire and are fitted with flat laminated copper links bolted to contact stalks taken up through the porcelains, while the lighting boxes are fitted with switch fuses on the outers of the three-wire circuits, these fuses making contact in spring clips which terminate the contact stalks. All these boxes are provided with diving-bell lids and lead-bonding devices.

The plug boxes for giving supply to cranes are of the vertical double-pole type and are provided with switch fuses to protect the outgoing flexible twin cables. The boxes themselves are of cast-iron while the plugs to which the flexible cables are attached are of gunmetal. In connection with each plug box a non-disconnecting branch box is installed from which branch cables are taken in pipes from the mains, these branch cables being sealed in the bottom of the plug boxes.

This new dock became necessary owing to the rapid growth of the trade handled. The tonnage of shipping entering the Hull docks in 1912 was 6,168,500 tons, an increase of seventy-two per cent in ten years. Imports and exports handled advanced by fifty-five per cent and the coal shipments rose by one hundred twenty-nine per cent to over 6,000,000 tons during the year 1912.

# Commercial Practice
# Management, Rates, New Business

### Public Policy.

The question of the relations between public utilities and the publc they serve is one of the most vital that the public-utility manager has to face. The relations between public utilities and the public are as delicate, as essential and as complex as is the nervous system of the human being. When they are out of tune, the one possible resultant is trouble. Their correction is possible only when a thorough and correct diagnosis is made. It is most gratifying to note that every progressive operator in the country realizes this fact and a thorough readjustment is now going on.

At the recent convention of the Southwestern Electrical and Gas Association, F. R. Slater, general superintendent of the Texas Power & Light Company presented a very interesting paper on the general subject of public policy of public utility corporations. He pointed out that the public utilities must accept the fact that they bear the same relation to the public as all other legitimate enterprises. They manufacture and have for sale a commodity for which there is a public necessity and demand; they are the servants, not the masters; they must treat all equitably; they must not discriminate; they must give good service; they must be frank, fair and efficient; in short, like all other business concerns, they exist for the purpose of rendering service for which they receive payment varying with the number of persons to whom their service is acceptable. Like all other business concerns, it is frequently necessary for them to render service which on the face of it, represents a distinct and heavy loss. They do this in the belief that the service thus rendered will meet with an appreciation which will eventually develop into profitable business.

The ordinary public-service patron has very little, if any, concern about franchise rights, public ownership and the other larger problems affecting the industry. The treatment he receives from the corporations' employees is personal. The executive officers of the companies he seldom, if ever, sees. The visible part of the corporation is to him the employee with whom he comes in frequent contact; if these are courteous, if they show consideration, if they are inclined to recognize his rights, it is the company that receives from him most of the credit. On the other hand, impoliteness, lack of consideration, etc., is scored as a black mark against the corporation. The accompanying "creed" and "courtesy" suggestions are recommended by the author as part of a public-policy campaign.

In another section of the paper he lays particular stress upon the attitude that the employee must take with reference to the work in which he is engaged and with the people with whom he comes in contact. Dependability is an essential characteristic for central-station employees and a valuable commentary on this subject is presented.

The development of public utilities has been more rapid than any other industry in the world; hence, it is not surprising that the public and laymen generally know so little about it. It behooves us to exert every effort to educate the public to a proper understanding of the utility business. It is

impracticable to educate the public as a mass, but the individual can be educated and if we educate enough individuals we will finally have the whole public educated. This can only be accomplished, however, through a broad, carefully planned campaign, carried forward through the periodicals, daily press and personal effort with patrons. This cannot be accomplished in a day, or probably in a year, but it must be accomplished before we can hope for any material improvement in the attitude of the public toward our business.

Friendly relations with the daily press is mentioned as one of the important requisites of a proper policy, as the newspaper can be made an asset and an invaluable ally, if the problem is given the intelligent attention it merits. The reporter has the ability and the opportunity to put thoughts into the minds of thousands of men and women every day.

**Courtesy.**

**Courtesy is no respecter of persons. It remembers that "a man's a man for all that" and gives a civil word and a helping hand quite as readily to the ill-clad stranger as to the "lords of high degree. Courtesy is something that the public not only has the right to expect, but it pays in many ways; it pays in the friends it makes; it pays in minimizing the friction of our lives; it pays in the personal satisfaction resulting from having done the right and kindly thing from our fellow men. As there is no end to the harm that discourtesy may do, likewise there is no end to the good which courtesy may do. It is the brook —flows on forever. Be courteous at all times.**

While the newspaper publicity, both in advertising and in the news columns will go a long way toward your ultimate end—making the public your friend—there is a great deal to be done along other lines. Making the public your friend is a fine art, and like most arts —an extremely simple one, once you know how. To establish public opinion in your favor you must demonstrate that you wish to remove all possible cause of complaints. You cannot win the public unless you honestly want to do the right thing. Honest effort and sincerity of purpose will make friends every time and this is true either as to corporations or the indvdual.

A business enterprise should invite complaints and suggestions for the betterment of the service. In the consideration of these, you can, as in no other way, impress upon the public the sincerity of your purpose. Complaints give a picture of yourself from the outside, and disclose weaknesses and imperfections which might otherwise remain undiscovered or neglected. Likewise, many valuable suggestions for improvement in service often comes from the public. Great care should be taken in the manner in which complaints are answered. In answering written complaints, all possible courtesy and consideration in the tone of your communication should be used, no matter how unfair, unjust or irritating may be the letter you have to answer. In answering complaints over the telephone, no better advice can be given than that posted on the transmitters of a certain railway company, which is reproduced herewith.

**Creed.**

**To do the right thing at the right time, in the right way; to do some things better than they were ever done before; to eliminate errors; to know both sides of the question; to be courteous; to be an example; to work for the love of work; to anticipate requirements; to develop resources; to recognize no impediments; to master circumstances; to act from reason rather than rule; to be satisfied with nothing short of perfection.**

When a patron calls in person to make a complaint, much diplomacy is required. He has usually called at some personal inconvenience, and not infrequently has recited to himself so many times his grievance, real or fancied, that he is on the point of exploding when he gets to your office. Listen to his troubles patiently, and try to take his viewpoint; you will frequently find that his grievance is trivial and can be readily adjusted without any real trouble on your part. If a complaining patron can be pacified, and at the same be shown that an endeavor is being made to remedy the situation he has brought to your attention, he is likely to prove a mighty live friend of the company ever after. Much adverse public sentiment with which corporations have to contend could be dissipated if systematic attention were paid to the troubles which individual patrons have on their minds.

Show appreciation of every service rendered by a patron. If he calls your attention to some fault or weakness in your service—thank him. If he makes a suggestion for the betterment of the service—thank him. If he gives you an order to furnish him your service —thank him. If he pays his bill—thank him. In short, for every service rendered, no matter how trivial, say "Thank you," and say it because you mean it.

**Telephone Conversation.**

**The tone of your voice on the telephone may make either a friend or an enemy for you or for us. If you were talking to a patron face to face, and you let a note of impatience creep into your voice, he might overlook it because of the friendlier aspect of your face, but over the telephone let the slightest suspicion of indifference or impatience creep into your tone and our interests will surely suffer. When you tell a patron you cannot do what he asks, take plenty of time to tell him why. When you finish talking to a patron who has given you patience or information, say "Thank you" and say it as if you mean it. Politeness pays.**

**Dependability.**

**To be dependable—to be singled out as one who does things —is a tremendous asset. A man may be faithful or industrious, or even capable, and still not be dependable. The faithful man may be incompetent; he who is capable may possess erratic tendencies which minimize his efforts, and the industrious man may be a blunderer. But the dependable man is he who can at all times be depended upon to do that which is set for him to do as it should be done.**

The one part of the utility business which is responsible for the greatest amount of friction between the companies and the public is the price to be paid for the service. The question has been the subject of numerous articles and the subject of discussion at almost every convention. The prices for utility service should generally be left to the natural working of business economies. The same factors which determine the prices in any mercantile commodity are the factors which determine the prices in utilities if due regard is had of the peculiarities of the business. For instance, in the central

station, the power cannot be made in hours of light demand and kept in readiness for periods of heavy demand, but the plant capacity for the heavy demand must be kept idle during the periods of light demand so as to be available when the demand comes. In all other lines of business, customers desiring service must await their turn if facilities for caring for them happen to be overtaxed. For instance, in all retail stores if the clerks are engaged you must wait; if the box office at the theater is busy, you must get in line; in using the telephone, if the system is taxed to capacity, the operator informs you the line is busy and you must wait. In other words, in all lines of trade, you may have service when demands decrease and capacity becomes available. In the electrical central station business, there is no such word as "Wait." At any hour of the day or night, when the consumer presses the button, turns on the switch or turns on the key, the response must be instantaneous. Therefore, every consumer should be expected to bear an expense somewhere near the cost of maintaining apparatus in idleness to serve him, plus a price for the current or gas actually used by him, and the whole subject to a series of quantity discounts, so arranged as to give the long-hour user a lower rate than the short-hour user.

These are some of the points upon which it is incumbent upon the utility manager to educate the public. Nor is all of the burden upon the shoulders of the public service company. What has been said with reference to fairness, courtesy, tolerance and forbearance upon the part of the company toward the public applies just as strongly as regards the public's attitude toward the company. The company is an important and integral part of the business community, and is entitled to the same courtesy, fairness, and impartiality that is shown every other business.

## Bridge Lighting Contract.

The City Commission of Lexington, Ky., has contracted with the Lexington Utilities Company to light the new Jefferson and Cemetery bridges, just completed by the city, for a total of $1,521 a year. The bridges will have 45 standards, each with one 50-watt and four 25-watt lamps to each standard. This represents $127 a month. J. White Guyn, city engineer, contended for much more brilliant illumination, arguing that the advertisement would mean a great deal to Lexington. The commission liked the idea but the engineer's plans called for $200 a month outlay and the city was without sufficient funds.

## The Toledo Publicity Campaign.

Considerable attention has been attracted lately to the unique publicity campaign which the Toledo Railways & Light Company has conducted in connection with its activities for renewal of franchise. In a recent issue of *Printers' Ink*, Thaddeus S. Dayton makes mention of this campaign as an example of good advertising and while Mr. Dayton has considered the situation purely from the advertising standpoint, his remarks should be of interest and value to public utility operators in general.

The old way of getting a street-railroad franchise from a municipality was for only two men at a time to meet in a dark room. The new plan is pages of display advertising in the city's principal newspapers. The tramway company tells what it wants, what it will give, and answers objections and criticisms.

This unique method of franchise-getting had a real trial recently in Toledo. It has created such widespread interest and made such a deep impression that a description of how it was carried on will be suggestive to the increasing number of corporations which are showing a disposition to reach out for popular good will.

The history of the Toledo franchise question is particularly interesting. Not only did it bring out the great value of display advertising and constructive publicity for public service corporations, but it showed that when the people know the facts they can be relied upon to give even a corporation a square deal.

Several years ago, when the Toledo Railways & Light Company realized that its franchises were soon to expire, it offered to make a three-cent fare for the morning and evening rush hours and to sell six tickets for a quarter the rest of the day. These rates were to continue until the company and the city should agree on the terms of the new franchise. This offer was accepted by the city.

Last autumn another political party came into power in Toledo, and the council, without any warning, passed an ordinance for a three-cent fare at all hours. The street-car company protested, and pointed out that the city's own accountants, after examining the property, had filed a report showing that if three-cent fares had been charged in Toledo the previous year the railways and light company could not have paid even operating expenses, let alone any interest on the investment.

The new ordinance went into effect at midnight March 27, this year. A half hour before that time no one in Toledo, not even the crews of the cars, knew what was to be done. Crowds of people gathered on the streets expecting there would be rioting when the conductors began to eject forcibly those who refused to pay a five-cent fare.

At the last moment the company did something unique in the history of street railroading. It told its conductors to use every peaceable means to collect the regular rate of fare, but that those who refused to pay more than three cents should be permitted to ride free. This rule has been in effect ever since.

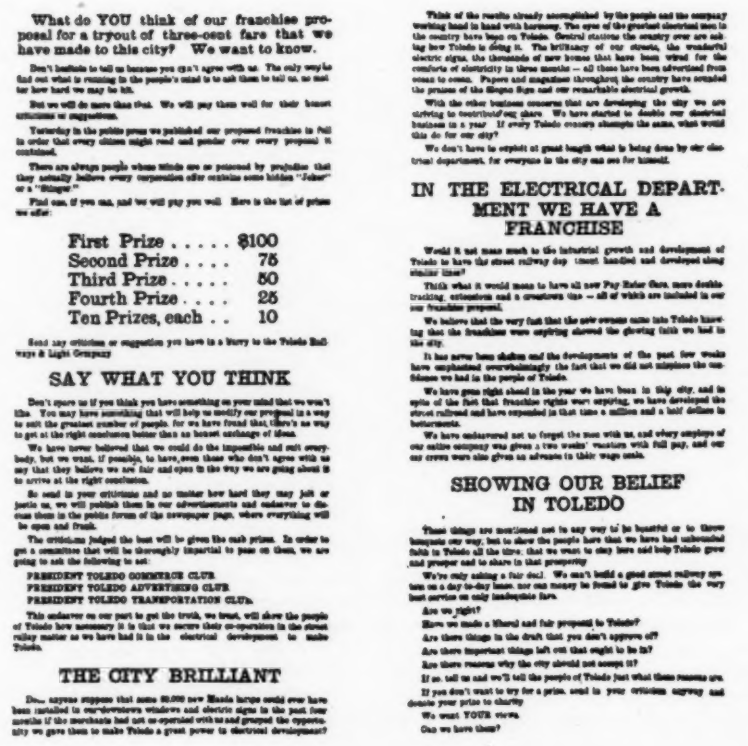
Despite the fact that the city, through its officials, has called upon the people repeatedly not to offer more than three cents fare, assuring them of police protection in so doing, about 80 per cent of the passengers have voluntarily paid five cents every time they have ridden on the street cars. This was due in a great degree to the advertising campaign that was inaugurated in April and continued through May and June by Henry L. Doherty, of New York, the largest individual shareholder in the property.

Negotiations for a new franchise were opened immediately. The street-car company offered to give the three-cent fare plan a trial for one year, and to pay the expenses of a commission of experts to lay out an ideal street-car system for the city. At the end of the first year the rate of fare for the next five years was to be fixed, and so on, every five years, during the 25-year term of the new franchise. Every provision was agreed to except the fare, the city council refusing to accept anything but the three-cent rate for the entire period of the franchise. The city gave notice that it would place a policeman on each car to compel the company to accept the three-cent fares. The business men, realizing that rioting would give Toledo the wrong kind of advertising, secured a withdrawal of the municipal order, and drew up a franchise that they considered fair to the city and to the street-car company. This is now being considered by the council.

While all this was going on the tramway company carried on its publicity campaign, using a page a day in each of the principal newspapers and issuing its printed arguments in pamphlet form every other day and distributing them on its cars. Lately a large part of this series of advertisements has been issued in the form of a bound book of 50 pages, each reproducing an advertisement as it was originally printed in the newspapers. This unique book has been distributed among bankers and financiers who are directly interested in public utilities.

Mr. Doherty wrote all the advertisements himself while he was in Toledo.

He was in the thick of the fight there for several months. Most of the advertisements were turned out at white heat, generally dictated just in time to be set up before the forms closed. He was so vitally interested in the matter that he preferred to do this ad writing himself rather than to intrust it to others. The whole thing, he was frequently heard to say, was to present exact knowledge to the public without any "pussyfooting." An employee writing these ads might have been timid and diplomatic, but the boss knew what he wanted to say and said it. The "punch" or "kick" in each one of these announcements may be judged from a few extracts.


SO THE PEOPLE MAY KNOW

What do YOU think of our franchise proposal for a tryout of three-cent fare that we have made to this city? We want to know.

Don't hesitate to tell us because you can't agree with us. The only way to find out what is running in the people's mind is to ask them to tell us, no matter how hard we may be hit.

But we will do more than that. We will pay them well for their honest criticisms or suggestions.

Yesterday in the public press we published our proposed franchise in full in order that every citizen might read and ponder over every proposal it contained.

There are always people whose minds are so poisoned by prejudice that they actually believe every corporation offer contains some hidden "Joker" or a "Sting."

Find one, if you can, and we will pay you well. Here is the list of prizes we offer:

| | |
|---|---|
| First Prize . . . . . | $100 |
| Second Prize . . . . | 75 |
| Third Prize . . . . . | 50 |
| Fourth Prize . . . . | 25 |
| Ten Prizes, each . . | 10 |

Send any criticism or suggestion you have in a hurry to the Toledo Railways & Light Company

SAY WHAT YOU THINK

Don't spare us if you think you have something on your mind that we won't like. You may have something that will help us modify our proposal in a way to suit the greatest number of people, for we have found that there's no way to get at the right conclusions better than an honest exchange of ideas.

We have never believed that we could do the impossible and suit everybody, but we want, if possible, to have even those who don't agree with us say that they believe we are fair and open in the way we are going about it to arrive at the right conclusion.

So send in your criticisms and no matter how hard they may hit or jostle us, we will publish them in our advertisements and endeavor to discuss them in the public forum of the newspaper page, where everything will be open and frank.

The criticisms judged the best will be given the cash prizes. In order to get a committee that will be thoroughly impartial to pass on them, we are going to ask the following to act:

PRESIDENT TOLEDO COMMERCE CLUB.
PRESIDENT TOLEDO ADVERTISING CLUB.
PRESIDENT TOLEDO TRANSPORTATION CLUB.

This endeavor on our part to get the truth, we trust, will show the people of Toledo how necessary it is that we secure their co-operation in the street railway matter as we have had it in the electrical development in make Toledo.

THE CITY BRILLIANT

Does anyone suppose that some 30,000 new Mazda lamps could ever have been installed in our downtown windows and electric signs in the past few months if the merchants had not co-operated with us and grasped the opportunity we gave them to make Toledo a great power in electrical development?

Think of the results already accomplished by the people and the company working hand in hand with harmony. The eyes of the greatest electrical men in the country have been on Toledo. Central stations the country over are asking how Toledo is doing it. The brilliancy of our streets, the wonderful electric signs, the thousands of new homes that have been wired for the comforts of electricity in three months — all these have been advertised from coast to coast. Papers and magazines throughout the country have extolled the genius of Toledo Signs and our remarkable electrical growth.

With the other business concerns that are developing the city we are striving to contribute our share. We have started to double our electrical business in a year. If every Toledo concern attempts the same, what would this do for our city?

We don't have to exploit at great length what is being done by our electrical department, for everyone in the city can see for himself.

IN THE ELECTRICAL DEPARTMENT WE HAVE A FRANCHISE

Would it not mean much to the industrial growth and development of Toledo to have the street railway day [illegible] and developed along similar lines?

Think what it would mean to have all new Pay Enter Cars, more double tracking, extensions and a greatness tips — all of which are included in our new franchise proposal.

We believe that the very fact that the new owners came into Toledo knowing that the franchises were expiring showed the glowing faith we had in the city.

It has never been shaken and the developments of the past few weeks have emphasized overwhelmingly the fact that we did not misjudge the confidence we had in the people of Toledo.

We have gone right ahead in the year we have been in this city, and in spite of the fact that franchise rights were expiring, we have developed the street railroad and have expended in that time a million and a half dollars in betterments.

We have endeavored not to forget the men with us, and every employe of our entire company was given a two weeks' vacation with full pay, and our car crews were also given an advance in their wage scale.

SHOWING OUR BELIEF IN TOLEDO

These things are mentioned not in any way to be boastful or to throw bouquets our way, but to show the people here that we have had substantial faith in Toledo all the time, that we want to stay here and help Toledo grow and prosper and to share in that prosperity.

We're only asking a fair deal. We don't build a great street railway system on a day to-day lease, nor can money be found to give Toledo the very best service on only inadequate fare.

Are we right?
Have we made a liberal and fair proposal to Toledo?
Are there things in the draft that you don't approve of?
Are there important things left out that ought to be in?
Are there reasons why the city should not accept it?
If so, tell us and we'll tell the people of Toledo just what those reasons are.
If you don't want to try for a prize, send in your criticism anyway and donate your prize to charity.
We want YOUR views.
Can we have them?

Toledo Railways & Light Company

Sample of Advertisement Used in Toledo Campaign.

One of the objections most frequently heard in the beginning of this franchise struggle was, "We don't want to give a franchise to any Wall Street concern."

"That is a criticism of the Doherty organization, and not the Rail-Light Company, and so I'm going to answer it personally immediately," said Mr. Doherty in display type.

"If a man wanted to deal in Alaskan furs he would not locate in El Paso, Texas.

"A man who wanted to go into the tropical fruit business would be foolish to located in Ashland, Wisconsin.

"We chose Wall Street as the best location for our business.

"My home was originally in Columbus, Ohio. Afterwards it was in Madison, Wisconsin; St. Paul, Minnesota; Quebec, Canada; Denver, Colorado, and elsewhere.

"So as I progressed from workman to foreman, from foreman to superintendent, from superintendent to manager, from manager to president, I had to go where opportunity offered.

"I wanted to go into business for myself and build and operate hydroelectric power plants, street railways, gas companies, etc.

"I had to locate some place.

"Where would you have gone?

"Columbus, Ohio? Not on your life.

"I wanted to get the first chance to buy any good proposition that came into the market.

"If there was a big hydroelectric power plant to be financed and built in some Western State, do you think the proposition would be brought to Columbus or even to Toledo?

"Not much.

"It would go to New York City, and not much time would be lost in uptown New York, either.

"Wall Street would be the objective point. Wall Street is the best known street in the world. Also the least understood.

"The popular idea is that Wall Street consists of the Stock Exchange, a herd of bulls and bears.

"I pass the Stock Exchange twice a day when I am in New York, and I was never even inside of it. *I never bought a share of stock on margin in my life.*"

Then he tells why certain kinds of business can be conducted most efficiently only in New York and in the Wall Street district. He says that he has received splendid treatment in Toledo—on the whole—from the mass of the citizens. He concludes:

"Well, I'm one of the 'common people' myself.

"I have carried my dinner in a pail and eaten it with the other workmen. And I could do it again.

"Most men think that when they have made a little money they must have a country house, a town house, a yacht and a flock of automobiles.

"Well, I have none of these things —not even an automobile. No, sir, not even a Ford.

"I live in the same apartment I had when I worked as an engineer on a small salary; it still has the same old furniture in it.

"Wall Street!!

"Forget it!!

"I am there because I have to be there.

"If a settlement of the street-railway problem is reached I will make Wall Street work for the benefit of Toledo."

From the foregoing it will be seen that Mr. Doherty, probably without knowing it, was obeying one of the fundamental rules for the writing of good advertising copy, by telling who he is and where he is.

The questions involved in the franchise fight were many and complex in their details. Mr. Doherty's side of it —what he had to offer—is discussed by him in many of his advertisements.

fact, he offered cash prizes for criticisms and suggestions. No matter how unfavorable the criticisms he received, he printed and answered them in his advertisements. Nearly all his displays were headed in 72-point, "So the People May Know."

The principal newspapers of Toledo did not look kindly on Mr. Doherty or his desire for the street-car franchise. That is putting it mildly. But they printed his page advertisements day after day without relenting in the least the severity of their news and editorial comment. For instance, the *Blade* printed a long editorial on the "free-ride folly," containing such phrases as this:

"And with a cold nerve seldom equalled since the first Vanderbilt sounded the first utility battle-cry the Rail-Light Company is demanding that public opinion support it in its brass-galled contention."

The next full-page Doherty advertisement reproduced the editorial in facsimile and said, among other things:

"We will try to give the editor of the *Blade* some simple facts that a child ought to understand.

"Most of the facts are common property to the intelligent reading public of Toledo.

"If the reading matter we place in the advertising space we are contracting for in the *Blade* is not even read by its own editor, we are wondering what is the value of space in this paper.

"We are not attempting to enforce our own 'self-made rates of fare,' but the rate agreed upon with Mayor Whitlock and which were to continue until a permanent settlement was reached."

"Be fair—be big, Mr. Editor."

Another page advertisement, set in six-point, with every sentence a paragraph, is devoted almost entirely to the subject of editors. It begins:

"Gee, but it's great to be an editor!

"If you're an editor all you have to do is to sit at a desk and smoke your pipe and criticise the man who fires the boiler, chucking in more coal so the editor can have his electric fan in the summer time.

"Some of our critics object to our English.

"Well, we may be bad—even rotten.

"But we will guarantee to keep cars running in spite of snow, or keep a sixty-thousand-volt transmission line running against the best professor of English you can produce.

"We want to supply a service to this community that will excel anything that has existed before in this community or elsewhere.

"This service means just as much to the laborer in the foundry as to the laborer in the bank.

"So that you, who make and supply bricks, have no more reason to be the enemies of us who supply car service than you have to be enemies with your neighbor who blows glass.

"Those of us who supply the necessities of life should all be friends.

"If we have differences of opinion we should settle them between ourselves."

Another page advertisement starts off with:

"Well, it was a great meeting at the council chamber last night.

"One interesting point that was made was the statement to the effect that if the city continues to negotiate with us it should be on condition that we abandon our publicity forum.

"Suffering Kate! What next?

"We have always been told that corporations love the ways that are dark.

"And now, when in answer to the public demand, this corporation adopts publicity, invites publicity and courts publicity, we find at the end of ten long weeks that we are wrong again."

Again:

"We have inaugurated our plan of a public forum to solve the street-railway problem.

"It is a new idea—an invention of efficiency.

"It can be used to settle other big problems that may arise in the years to come and upon which the growth and prosperity of Toledo may depend."

This advertising campaign is said to have cost in the neighborhood of $10,000. The Toledo street-railway franchise is again before the city council. The Doherty advertisements have not been run since the first of July, partly because they have served their purpose, thus far, and partly in order to leave the city council unhampered in its deliberations.

Mr. Doherty is not in a position, as yet, to state definitely the results of his unique advertising campaign. His belief in the power of display advertising, however, is best expressed in his published announcements. In these he says:

"I was told: 'You have no right to spend money on advertising. This money should be spend to provide better service.'

"My answer about advertising is that the corporations of the country have had a world of criticism and abuse for not taking the public into their confidence—not attempting to tell their side of the story. Much of this criticism has probably been merited. But the public utility men are not trained to talk or write. Many of them are engineers. They could not tell their story to the people in a readable way that would be understood.

"I wanted to get the people thinking, and said if we couldn't get our story in the news columns we would buy advertising space and tell it.

"The real umpire is the public. The public can be awfully wrong at times, but, in spite of all, it's the best and truest umpire I have ever found. I wanted the good will and confidence of the people of Toledo. The old public utility methods are practically a thing of the past. Our plan of a public forum by publicity met with hearty support. I believe that this method will have an important place in the future municipal affairs of this country."

## Edison Electric Farm at Lexington Park.

Co-operating with the Middlesex & Boston Street Railway, which operates Lexington Park, a suburban pleasure resort 14 miles northwest of Boston, the Edison Electric Illuminating Company of Boston is exhibting its Electric Farm on the park grounds as one of the special attractions.

On a plot of ground on the hillside which has been leveled for the purpose, the Edison company's large demonstration tent, 100 feet by 60 feet, has been erected and in it installed a brilliant lighting equipment consisting of 13 500-watt tungsten lamps. On poles outside, six lamps of the same type and capacity serrve to light the approaches.

The tent contains an admirable display of household and farm implements all motor driven and operated. The domestic appliances are arranged on one side of the room and the farm machinery on the other. The household appliances consist of coffee percolators, tea samovars, chafing dishes, egg boilers, toasters, vibrators, heating pads, flatirons, electric fans, lamps, vacuum cleaners, washing machines, and as a special attraction an electric range of the Simplex manufacture, its novel feature being that each cooking pan is controlled by a separate switch.

A demonstrator is in attendance to show these appliances and to take orders for them.

The farm implements displayed include a cow-milking machine with which the company's own cow is milked daily at 8 p. m. for public view. There is a motor-driven churn, a milk-testing machine and a separator. A milk-bottle washing machine exhibted will wash 1,000 bottles at a cost of only about one cent for energy.

Pumps, clipping machines, hay hoists, an oat and an ensilage cutter, a bone cutter, vegetable grinder, cider mill, incubator and brooder, a wood-sawing machine, grindstone, forge-blower, soldering iron, glue pots, etc., comprise the list of agricultural implements operated by electricity.

A five-horsepower motor mounted on a truck operates anywhere in the open area between the two lines of apparatus, a belt connecting it with any of the

apparatus which it is desired to drive.

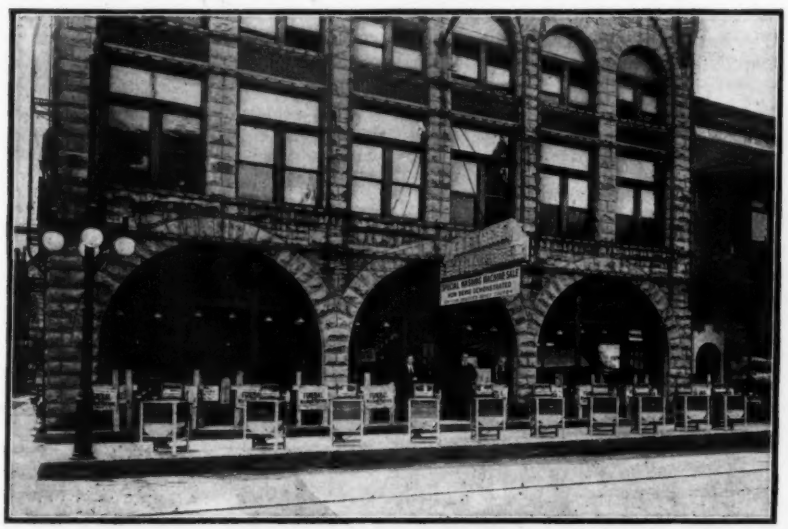
All the exhibits are installed on a platform five inches above the earth floor of the tent, and the lead-covered cables carrying the conductor are run along the ground underneath, with outlets through the floor to the several machines.

Two switchboards are installed, one for the domestic appliances and the other for the farming machinery. Mains are run from the company's circuits along the highway in front of the park. Current at 110 volts operates the motors and other apparatus.

The Edison Company furnishes energy for the operation of the street railway and also for the park lighting.

The Electric Farm is advertised as one of the free features of the park. Posters and dashboard on the cars carry conspicuous announcements of the farm, and the exhibition was a specially attractive feature of the Grangers' Outing held at the park August 19.

The exhibition is to remain on the grounds until about September 1.



Joliet Offices of Public Service Company Showing Shipment of Washing Machines.

## Washing-Machine Campaign at Joliet.

The accompanying illustration of the Public Service Company's office at Joliet, Ill., shows an attractive window and sidewalk display of one day's shipment of Federal washing machines, as exhibited during the June washing-machine campaign of this company. The total number of all kinds of washing machines sold in thirty days was seventy-four.

This unparalleled record is the result of the excellent co-operation between the manufacturer and the local central station. It is not due to any particularly favorable conditions or any particularly favorable offer of the central station to the consumer, but just good hard work along the following lines.

To begin with the campaign was not decided on in a moment, but carefully planned months in advance. The entire force of the Public Service Company's solicitors in conjunction with their other duties, compiled 10,000 names of the most likely prospects in Joliet. This entire 10,000 was circularized with a letter outlining the terms on which the machine could be purchased and an invitation to call at the office and see it demonstrated or have the machine demonstrated in their homes.

In conjunction with the circularization local newspaper publicity was used extensively and on each bill sent the customer the preceding month, there was a coupon attachment valued at $5.00 to apply on the purchase price of the machine.

A special sign advertising the washing-machine sale was erected and each day's shipment of machines when it came in, was prominently displayed along the outside in front of the store and in various windows.

In conjunction with this, the Federal Sign System maintained a demonstrator at the Public Service Company's headquarters and two experienced salesmen, working with the Light Company's representatives. The salesmen had an automobile at their disposal and received every possible support from the Light Company and its representatives.

The campaign was well planned, well conceived and well advertised, and most important of all, properly followed up by the sales force, which might truthfully be said to have made a house to house canvass of the City of Joliet.

The following is an extract from a news item appearing in the Joliet daily papers regarding the campaign:

"The sales force and officials of the Public Service Company were the guests of the Federal Sign System at a dinner last night in the Hobbs Hotel. Breaking the record in the Company's territory for one month's sale of washing machines was responsible for the banquet.

"During the period between June 1 and July 1 the Joliet salesmen sold 70 machines. Each machine sold for $80 and the receipts, $5,600, were in excess of any other office for the month.

"Superintendent Hill said this morning that the record was surprising. We thought that the very best would be 50 machines. It speaks well for the prosperity of Joliet."

## Nitrogen Street Lamps in Bowling Green, Ky.

The Kentucky Public Service Company, which serves numbers of the cities and towns of western Kentucky, has just begun to give Bowling Green, Ky., a nitrogen-lamp street-lighting service, having turned the current into a circuit in the central part of the city with 41 lamps on it. As rapidly as possible the remaining sections of the city will be similarly equipped with the same lamps and the obsolete arc lamps will be disposed of. It was not long ago that Bowling Green by common consent of its Council, Board of Public Works and citizens, abandoned the municipal street lighting plant which, it was found, was representing an excessive outlay for operation.

## Complete Central-Station Service for Hotel.

Among the features of a $400,000 improvement plan in the Baltimore Hotel, Kansas City, Mo., is the removal of the heating and lighting plants from the hotel. Heat will be secured by steam through the pipes from the steam plant of the Kansas City Electric Light Company, a block from the hotel. Electric light and power will be supplied by current from the Kansas City Electric Light Company's wires.

## Testimonial to Central-Station Service.

The Western Union Telegraph Company has contracted for a supply of electric current from the New York Edison Company instead of depending on storage batteries for telegraphic communication in New York city. The New York Edison's record for reliability and continuous service was a factor in the closure of the contract.

## "Dollar Sale" in Joplin.

The Empire District Electric Company, Joplin, Mo., recently conducted a "Dollar Sale," which was very successful from every standpoint. Various electrical devices were offered for sale for $1.00, and in addition $1.00 was accepted as first payment on a number of more expensive appliances.

# Electric Vehicle Data

### Electric Vehicles in Factory Service.

The data presented on this page this week indicate the successful operation of a two-ton electric truck in the service of the Palmer-Bee Company, of Detroit, Mich., manufacturers of factory supplies and heavy engineering equipment. It is significant that in the city of gasoline cars there should be so many electrics used, and especially by the firms who are in a position to carefully weigh the merits of all methods of transportation. The Palmer-Bee organization is especially fitted to make careful engineering comparisons between gasoline and electrics and the selection of the latter type of car may justly be considered as a strong recommendation for the battery vehicle.

The ability of the electric to successfully handle heavy loads under practically all weather and road conditions is one of the principal advantages that influences its adoption in industries such as the Palmer-Bee Company represents. Absolute reliability is more desired than speed and in this the electric is universally conceded to excel.

It is also frequently desired to combine a hoisting equipment with the vehicle when handling heavy machinery and material, and the simplicity of the electric motor for this service is too well known to need further comment.

As to costs, the figures presented herewith are extremely low when it is considered that the truck is in service nine hours daily, every working day of the month. The operating cost of $125 per month does not include interest or depreciation, but it will be noted that no expenditures have been necessary for repairs, so it would seem that the latter item should be low.

---

Writing of the care of storage batteries in electric-vehicle service, Walter R. Metz, of the Government Printing Office, Washington, D. C., says: "Probably the most important part of a car is its battery equipment, and the owner of a number of cars will be well repaid if he places competent men in charge to look after this detail.

"Our batteries are looked over every night and the results have fully justified the trouble, for we have been running now for two years and seven months on the original batteries, and they are in a very good condition today, and apparently good for a long time.

"In our garage we aim to give each battery a good overcharge every two weeks, and water the pilot cells just before the overcharge. The batteries do not usually need watering more than once in two weeks. Readings are taken immediately after overcharging, and we attempt to equal this reading each night. Readings of both hydrometer and temperature are taken as far as possible every day, the rule being to read twice each night, and special care is taken to compare temperature with gravity. When the temperature increases the hydrometer reading will drop, and it has been found that an increase of 10 degrees will result in a decrease of 3 points in the hydrometer reading. If the results vary from the above, the battery man looks for the trouble.

"A good point to remember in taking hydrometer readings is not to depend upon the first reading. If the hydrometer syringe is used on a certain battery and then on another, there is very apt to be a variation from the true reading of the second cell, but if some of the acid is drawn out and then put back, and drawn out a second or third time the reading will be correct. The reason for this is that some of the acid from the cell first read is apt to adhere to the syringe and it has been found that the first reading is often misleading.

GENERAL.

| | |
|---|---|
| Name of Company—Palmer Bee Company, Detroit, Mich. | Make of Battery—Edison. |
| Business—Factory Supplies. | Date of Purchase—January 28, 1913. |
| Capacity of Vehicle—2 tons. | Make of Vehicle—Detroit. |
| Approximate Price—$3,750. | Size of Tires—3½ inch front; 4 inch double rear. |
| Make of Tires—Goodrich (Solid). | |

OPERATING DATA.

| | |
|---|---|
| Average Daily Mileage—40. | Driver's Salary, per month—$70. |
| Daily Hours in Use—9. | Cost of Repairs and Renewals for 12 Months—None. |
| Kilowatt-Hours per Month— | Cost of Storage and Washing; Cost of Electric Power—$55. |
| Days in Service, per Month—25. | |

Total Average Monthly Operating Cost—$125, not including depreciation or interest charges.

# Electrical Construction

## ELECTRICAL FEATURES OF THE NORTH AMERICAN BUILDING.

By Norman G. Meade.

Practically all modern buildings present a number of interesting electrical features, the large office buildings being good examples. The North American building is one of Chicago's later skyscrapers, twenty stories in height, devoted to stores, offices and a large restaurant in the basement. The building contains a large private plant including a refrigerator plant used in connection with the restaurant.

Power circuits use the generator voltage, but the lighting circuits are served by a three-wire 110-220-volt system, the voltage for motors being 220 volts and that for lighting 110 volts. There are two balancer sets connected to the generator circuits for furnishing the three-wire lighting supply. One set is held in reserve. The armature and fields of the balancer sets are connected in series and the third or neutral wire is tapped to the connection between the positive of one unit and the negative of the other. The operation of balancing sets is too well known to need further explanation here.

The next feature to demand attention is the arrangement of feeders near the main switchboard. The feeders are carried in conduit from the rear of the switchboard to a box cable duct near the ceiling which carries the cables to the cable shaft leading to the top of the building, and to various points of distribution. It is claimed that this method of handling main conductors gives a flexibility to the location of cable outlets which materially aids the contractor as conditions frequently arise that make it difficult to carry a feeder in the exact location called for by the drawing.

Fuses for the feeder circuits are mounted on the rear of the board being supported in several parallel rows below the conduit ends. The latter are held rigidly in position by suitable supports and no exposed wiring is visible from the front of the board.

Throughout all parts of the building where exposed conduit work is employed, special sheet-metal boxes are used for fuse and switch panels, and for housing motor switches and starters. The boxes have beveled edge covers to insure rigidity and are provided with handles similar to those of a safe. N. E. C. standard inclosed fuses are used in both the lighting and power cabinets. The power cabinets also contain the motor starting rheostats thus furnishing a mechanical protection for the starters and at the same time decreasing the possibility of any one tampering with them.

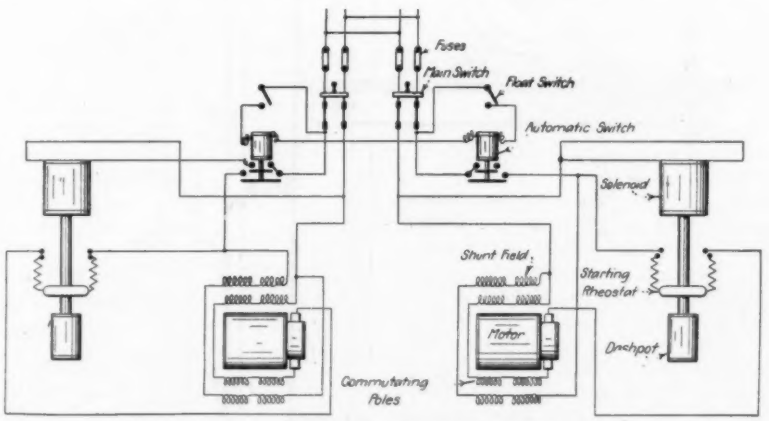



Fig. 1.—Connection Diagram of Ejector

### Metering Service.

The power plant in the North American building is considered as a subsidiary feature and overhead charges, operating expenses and depreciation are charged against it as though it were separate from the building. All feeder circuits are metered and most of the motor circuits have watthour and Wright demand meters on the starting panels. The charges against different services are based on central-station rates so that a comprehensive record of all details of operating costs can be compared with the meter readings, thus permitting an accurate relation between revenue and expenditure to be shown.

### Special Pumping Apparatus.

As a general rule the lower basement floors of buildings of any considerable size are below the street sewer level, consequently sewage and drainage water have to be elevated. For removing the sewage a Yeomans duplex electric sewage ejector is employed. This apparatus is novel in construction, and the electrical control is of especial interest. Figs. 2 and 1 show respectively a sectional elevation and plan of the ejector and the connection diagram.

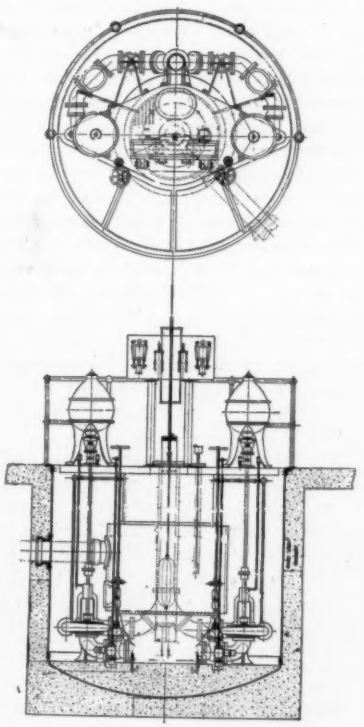


Fig. 2.—Sectional Elevation and Plan of Ejector

The ejector consists of a central cast-iron receiver to which the building

drains are connected. It supports at the floor level a cast-iron plate serving as a suspension for the receiver and as a base plate for the motor. The pumps are of the bottom-suction vertical, centrifugal type, connected to the base of the receiver by valved suction pipes.

Pumps and motors are direct-connected, the latter being of the vertical-shaft semi-inclosed slow-speed type with commutating poles. Each is rated at nine horsepower, 220 volts, and the pumps have a capacity of 200 gallons each or a combined capacity of 400 gallons per minute when both are in operation. The float switches are mounted on slate panels supported by an angle-iron frame and pipe standards between the motors. Main line switches with fuses, automatic float switches and self starters are provided for both motors and if necessary the controllers and motors may be interchanged.

Automatic float switches are actuated by a reinforced copper column float, running in an 8-inch pipe casing suspended from the receiver cover. By means of adjusting buttons the float switches may be set so that one unit will take care of the ordinary service but if for any reason that unit should fail to operate or if the flow to the ejector should exceed its capacity the other machine will instantly start. The starters are of the button type with air dashpots. All circuits to the ejector are carried in conduit. The main switches and fuses are inclosed in a metal cabinet similar to those already described; motor and controller leads are enclosed in iron conduits with condulets at the pipe ends.

A bilge pump is employed to drain all elevator and machinery pits. It has a capacity of 100 gallons a minute against a 60-foot head and is driven by a 7.5-horsepower 220-volt motor at 1,500 revolutions per minute. The electrical control is similar in principle to that of the sewage ejector with the exception that it is designed for a single motor.

## Peculiar Accident Causes Suit.

An injury of an extraordinary nature has been made the basis of a damage suit against the T. D. Lawrence Electric Company, of Cincinnati, O., and Carl Dickerscheid, an electrician who installed a fan in the Trades Council Hall in that city, according to the allegations of a petition field by Charles W. Wilson. Wilson says that on June 14, of this year, he was in the room when some one started the fan, and that it flew from its place and struck him on the head, injuring his left eye and inflicting a severe scalp wound. He charges that the accident was due to negligent work in installing the fan.

## A PIPE LADDER FOR ELECTRICAL INSTALLATIONS.

By Henry Brady.

In connection with the installation of electrical apparatus, ladders of a cheap, substantial construction are often required. Such ladders should be of a type that can be readily erected by the wireman, and should be built of materials easily obtainable about an industrial plant. They should also be very strong to eliminate the possibility of accidents to workmen.

Ladders of the type illustrated and described in this article have been used in the industrial plants operated by a certain corporation for a number of years, and have given complete satisfaction. They are cheap, strong, and are readily assembled and erected by any wireman. The design is such that a ladder built in accordance with the method suggested is very compact, and can be modified so as to satisfy the requirements of practically any location.

Fig. 1 shows one of the ladders installed, and Figs. 2 to 5 inclusive indicate the details of construction. The ladder column is a piece of 1.5-inch standard-weight wrought-iron pipe, or 1.5-inch electrical conduit. Wrought-iron pipe is ordinarily used if available, because it is the cheaper.

The rungs are castings, which for the ordinary application require no machining. Each rung is held to the pipe column with a U-bolt bent from 0.5-inch iron rod. In the typical application suggested in Fig. 1 the pipe ladder is installed between the floor and a platform supporting a motor that is mounted near the ceiling of the building. At the point where the pipe column rests on the floor and where it rests against the platform at its upper end, standard 1.5-inch malleable-iron floor flanges are used. Where the flanges rest against a wooden surface, they are held thereto with lag screws. Where the surface is of metal, as it frequently is in structural steel buildings, the steel should be drilled and tapped and machine bolts should be used for holding the flanges.

With concrete surface, it is best to cast bolts, suitably located, in the concrete at the time it is poured; but if this procedure is not feasible, the concrete can be drilled and expansion bolts used for securing the flange.

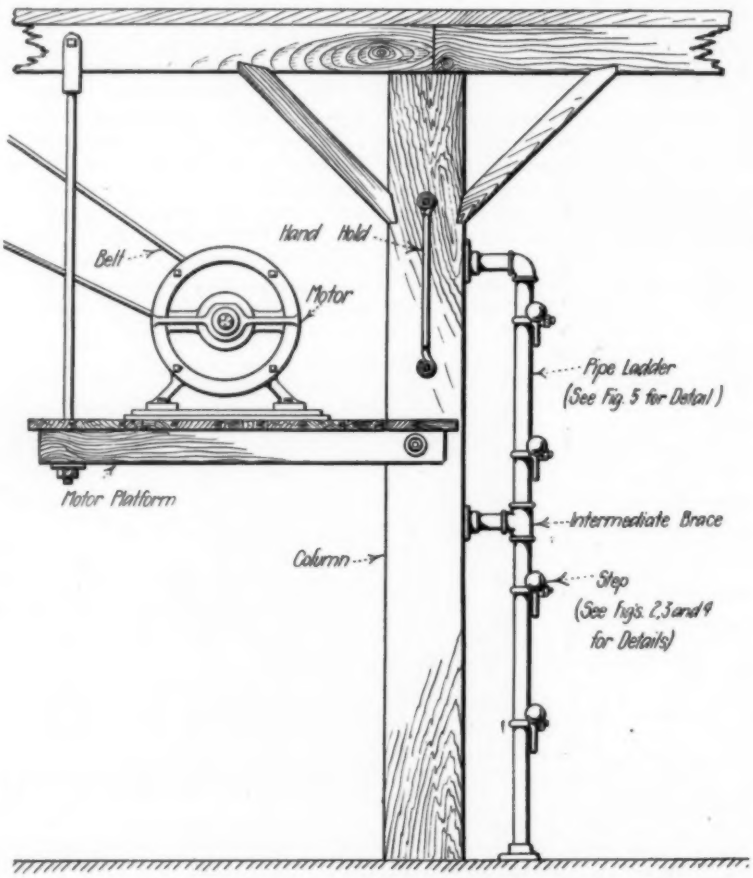



Fig. 1.—Completed Pipe Ladder Installed

Where the ladder exceeds a length of possibly 10 feet, intermediate braces should be used, as shown in Fig. 1, to insure rigidity. Each of these braces is made from a standard 1.5-inch pipe tee.

At the upper end of the ladder it is usually desirable to provide some sort of hand-hold so that a workman, ascending and stepping off the ladder, will have something to grip to brace himself while he is stepping off. Suitable hand-holds can be bent from 0.5-inch iron rod, or instead of these, malleable-iron handles, such as are used for heavy doors can be employed.

The pipe fittings required are always obtainable. The rung casting is

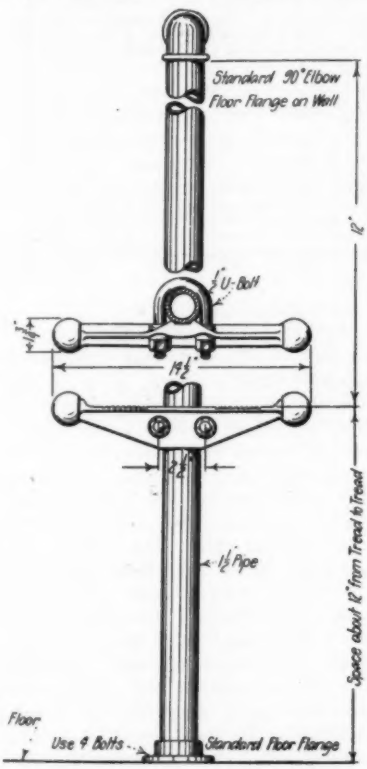



Fig. 2.—Erection Details of Ladder

made from a pattern, the dimensions of which are given in Figs. 3, 4 and 5. The tread of the rung is corrugated to prevent the slipping off of the workman's feet. The spherical knobs at each end afford a smooth place to grip the hands while one is ascending. The holes for the accommodation of the U-bolts can be cored. Where it is essential that the installation have a finished appearance, the body of the rungs should be painted black, the spherical knobs should be ground with an emery wheel so as to expose the bright metal.

The body of each rung has a T-section, which insures maximum strength with minimum material.

In Fig. 2 the erection details are indicated. The U-bolts should be bent to a diameter of 1-29/32 inches so that it will set snugly around the 1.5-inch pipe column. (The actual outside diameter of nominal 1.5-inch pipe or conduit is 1.9 inches.) The ends of each of the rods that is to be bent into a U-bolt should be threaded before the bolt is bent, because after it is formed into shape it is impossible to turn the

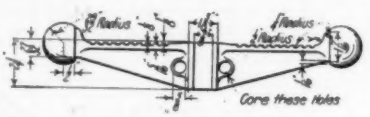



Fig. 3.—Side View of Rung

die to cut the threads. Each end should be threaded for about one inch. The best way to form these U-bolts is to cut off and thread as many of the little rods as will be required; then each one can, after being brought to a red heat, be bent around a piece of 1.5-inch pipe held in a vise. If this practice is followed, a good fit between the U-bolt and the pipe is certain.

The rungs should be spaced along the columns about 12 inches between

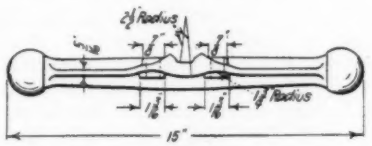



Fig. 4.—Bottom View of Rung

centers, and the lower rung should be about 18 inches from the floor. If it is placed too close to the floor it may interfere with sweeping and traffic.

In communities where malleable castings can be readily obtained, an added factor of safety is provided, if this material is used instead of the cast iron for the rungs. While the cast-iron rung shown in the illustrations has proved to be of ample pro-

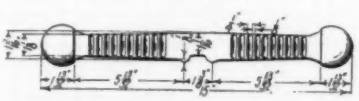


Fig. 5.—Top View of Rung

portions to safely sustain the weight of a man, malleable iron is, of course, much stronger, and is particularly useful for the rungs that are located close to the floor. Unless a railing is built around the foot of the ladder, trucks being hauled around the plant may be bumped into them, and sometimes the cast iron rungs are broken, due to this interference. Malleable-iron rungs may bend, but they will seldom break in such cases.

Where good clean castings cannot be obtained the two cored holes through each rung for the accommodation of the U-bolts should be 0.75 inches instead of 0.625 inches in diameter. Where 0.75-inch holes are used, standard 0.5-inch punched iron washers should be inserted under each of the nuts that turn on the U-bolt.

## Proper Distances Between Pull Boxes.

There appears to be considerable difference of opinion between wiremen as to the maximum distance that should be allowed between pull or outlet boxes in conduit wiring systems. The writer has always maintained that it is poor economy to so lay out a conduit run that the distance between pull boxes will exceed 150 feet. It is believed that, all things considered, it is better to so lay out the work that it will not be necessary to pull wires for more than 100 feet.

Installations have been made wherein the pull boxes were 250 feet apart. In these installations it took a great deal of time to get the snake through the conduit, and it took more time to pull the conductors in, after the pulling-in line had been fished through with a snake. Furthermore, the long pull did some damage to the insulation on the conductors. The writer thinks that there should be a rule in the National Electrical Code which would limit the distance between pull boxes in conduit runs.

Arthur Wiener.

## Registered Electrical Contractors in Chicago.

According to the annual report of the Department of Gas and Electricity, Chicago, Ill., 690 certificates of registration were issued on or before December 1, 1913, to persons or companies engaged in electrical contracting business. On November 1, 1913, an amendment to the city ordinance, went into effect. This amendment provided for the registration of all companies or persons obtaining permits for electrical work, the object being to obtain the services of a thoroughly competent electrician for all electrical work.

## State Electrician Proposed for Missouri.

A committee of the Electrical Contractors' Association of Missouri is laying plans to secure from the State Legislature at the next session a law providing for a state electrician. Such a provision would be especially desirable by St. Louis, where there is no city electrician and inspections depend chiefly on the underwriters. The legislative committee consists of A. J. Burns, of Kansas City, William Koeneman, of St. Louis, and L. E. Reid, of St. Joseph.

## EFFICIENCY IN THE ELECTRICAL-CONTRACTING BUSINESS.

### Some Suggestions for Increasing Efficiency.

Efficiency is the watchword of the age. Strenuous efforts are being made to eliminate lost motion, to minimize waste, to turn waste materials into goods of value, to reduce or eliminate losses and to cut off a minute or two from the time required for various operations. Many large firms have added one or more efficiency engineers to their payrolls, feeling confident that these men through systematic study of the work being carried on by these firms will be able to effect savings that will be greatly in excess of their salaries.

The electrical-contracting business presents no exception to the success of modern efficiency methods. It is true that conditions in various types of businesses are not the same, but the same is true even within the electrical-contracting business itself for the methods employed by no two firms can be said to be exactly the same. It is not the object of this article to enter into a full discussion of the subject of efficiency in the electrical-contracting business for the methods employed by the various firms and the conditions that have to be met by them are varied in nature and no general rules can be given that will apply to all, but rather to bring to the attention of the electrical contractors a few facts that it is hoped will be of value to them and to impress upon electrical contractors the fact that it is well worth their time to investigate and study the conditions existing in their offices and on their work, with a view towards eliminating lost motion, that is, eliminating unnecessary work, with a view towards so arranging the work of each employee that each will be working under the best of conditions and at his maximum efficiency, and in general with a view towards cutting off a minute or two from the time required for each piece of office work and for each operation of the electricians with a view towards saving hours and thus dollars. The saving of time does not imply driving employees, for men cannot work efficiently under such conditions, but rather to study the services that they are performing and discovering and calling to their attention methods whereby they can eliminate unnecessary motions and unnecessary steps to both their and their employer's advantage.

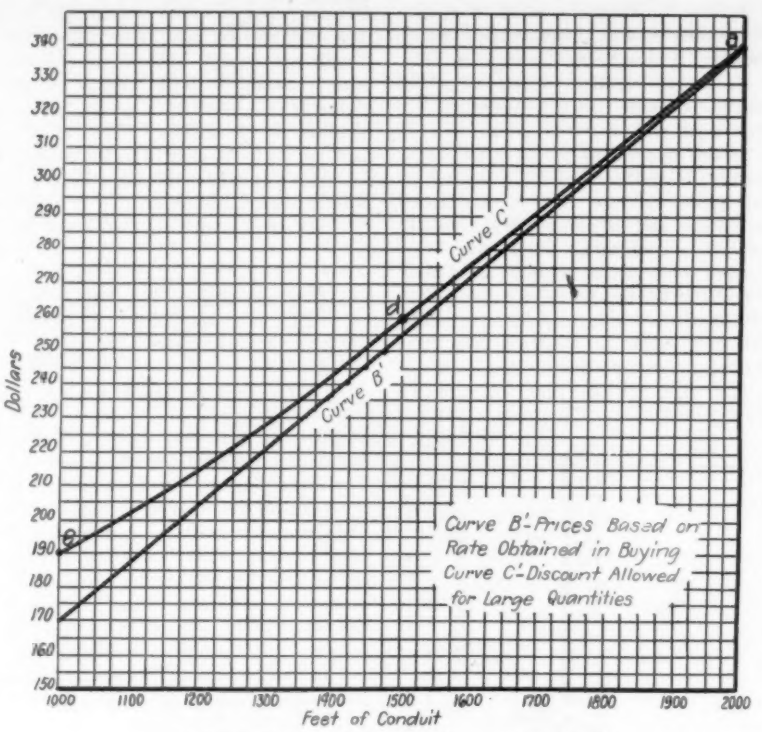



Fig. 2.—Section of Complete Curve of Costs.

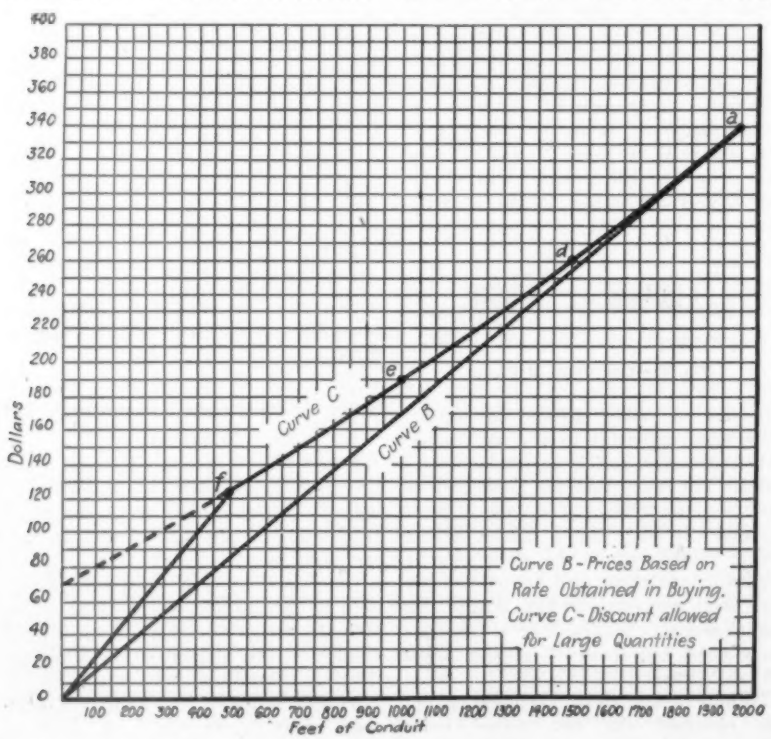



Fig. 1.—Complete Curve of Costs.

In fact it is well to stimulate the minds of employees to thoughts of efficiency by maintaining suggestion boxes into which employees may drop notes containing suggestions for improving the efficiency of the organization and for which payment is offered for every adopted idea with possibly a bonus for the best idea. Make the employee feel that it is to his as well as his employer's interest to aid in the fight for efficiency. Co-operation and the unification of the interests of the employer and his employees can produce great results in the way of efficiency.

### Efficiency on the Job.

The progressive contractor of today has long since abandoned the horse

and buggy and the horse and wagon as means of conveyance. These as well as trolley cars are too slow for the efficient carrying on of business over wide areas. Today the progressive contractor utilizes an automobile to take him from one job to another, while his workmen are provided with one or more automobile trucks for carrying material and for going to and from jobs. Each minute saved means the saving of at least a few cents. Moreover the automobile is not only a means of conveyance but a source of power. The engine or motor can easily be arranged for doing various mechanical work on the site of a job. Hand operation of portable machines may be dispensed with and if electric trucks are employed energy may be taken from their batteries for the operation of portable drills, etc. The propelling machinery of an automobile is equivalent in power to that of hundreds of men, for the average man is only capable of performing mechanical work at the rate of about one-eighth horsepower.

But efficiency on the job depends not only the use of labor-saving devices but also upon the efficiency of these devices and of the men employed. Unless constant check is kept on the men it will be found that in many cases they loaf on the job. A contractor who employs a rigid time-checking system recently stated that he discovered that two men on a certain job were only installing about eight drop cords a day. *Knowing* what constituted a reasonable day's work for two men on such work, he immediately called the attention of the men to the fact that they were not paying due attention to his interests. The next day's work of the same two men resulted in the installation of 23 drop cords. It is only through *knowledge* of what constitutes a day's work under various conditions and a proper checking of the work of each man that labor costs can be reduced. If an electrical contractor has not this knowledge it is imperative that he acquire such knowledge immediately by studying the subject and adopting a checking system at once. If a contractor has not the time to attend to this matter himself it will more than pay him to transfer the work to an assistant.

Waste is another factor that enters into the subject of inefficiency. Unless a rigorous check is kept on all material used it will be found that much useful material is being scrapped. It is folly to use wire from a coil of say 200 feet when 175 feet is required and part of a coil containing approximately the amount required is available. The men will scrap the extra 25 feet unless there is immediate use for the same. A cable and wire schedule showing from what reels and coils the runs should be taken from in order to insure either none or a minimum amount of waste should be worked out. Short lengths of wire or cable constitute waste when thrown away and if saved, but no effort made to keep the number of such short lengths of wire to a minimum, it will be found that the multitude of such short lengths of wire will be enormous.

Constant checking of all work and all materials is essential to efficiency. Efficiency on the job depends upon many other factors that cannot be discussed here, but all can be summarized in the word "knowledge"—a knowledge of what is being done and how it is being done and a knowledge obtained through study of what ought to be done and how it ought to be done.

**Efficiency in the Office.**

There is much need for the adoption of efficiency methods in the average contractor's office. Most contractors realize that it is poor economy to buy in small quantities, yet all do not study the markets for material with a view towards taking advantage of periods of low prices. Copper varies in price, and hence copper wire varies in price. The same is true of other material. The electrical contractor should aim to buy all material during periods of low prices. Electrical material is not perishable and a large stock of material is no disadvantage.

Perhaps the greatest field for the adoption of efficiency methods in the office lies in the work of estimating. In order to avoid errors many contractors employ elaborate checking systems, one man checking another. Yet even the original estimate is often figured in an inefficient manner, and the checking done in a still less efficient manner. It is true that many contractors employ adding machines to check up the sums of various items, but many fail to take advantage of other modern methods of calculating.

Figs. 1 and 2 show curves of cost of conduit. When large quantities of conduit are carried in stock the contractor can easily make curves which will tell at a glance the cost of the quantity of conduit required for any job, even when the contractor bases his prices for such material on the quantity prices offered by the jobber or manufacturer. The curves in Fig. 1 are drawn upon the assumption that a small contractor has recently purchased 2,000 feet of conduit for $340. The same conduit when bought in smaller quantities is assumed to cost as follows: 1,500 feet, $260; 1,000 feet, $190; 500 feet, $125. Taking a sheet of cross-sectional paper, each division of the horizontal axis is assumed to represent 50 feet of conduit, and each division on the vertical axis, ten dollars. Knowing that 2,000 feet of the conduit cost him $340, the contractor locates the 2,000-foot line and follows it vertically, until he located the $340,-horizontal line and thereby locates the point *a*. Joining *a* to the point *o*, *o* or the lower left hand corner of the curve sheet in this case, by means of a straight line it is possible to read off the actual cost of any length of conduit up to 2,000 feet.

Assuming that the cost of 500 feet of conduit is desired without any increase in price being made because of reduced quantity. Locating the vertical line marked 500 on the lower edge of the sheet, one has only to follow this line vertically until it crosses the line *B*, or curve *B*. Locating this point one has only to follow the horizontal line passing through this point to the vertical edge of the sheet where one finds the figure $85, the cost of 500 feet of conduit.

In the same manner the cost of other lengths of conduit may be determined, it being easily possible to estimate to tenths of the distances between lines.

If, however, the contractor believes that his customers are only entitled to the prices asked by the jobber or manufacturer for the various quantities desired, he can plot the additional points *d*, *e* and *f*, representing the prices asked for lots of 1,500, 1,000 and 500 feet, respectively. These points may be joined by straight lines or a smooth curve may be drawn through them, the latter being preferable. The line C is a smooth curve drawn through the points and represents the cost of various lengths of conduit based upon the discounts allowed for various quantity lots. However, this curve allows more than the discounts offered for 500, 1,000 and 1,500-foot lots, the discounts being graduated between the values. That is, almost the entire percentage discount for a 1,000-foot lot is allowed on a quantity of 900 feet, while the percentage discount allowed on 600 feet is only slightly greater than that allowed for 500 feet. Joining the points by straight lines also causes the curve to represent prices based on a gradient system of discounts, the variations in discounts between any two of the points *a*, *d*, *e* and *f*, being proportional to the increase in length of conduit ordered above the lower point of the two between which the length of conduit ordered lies.

The contractor hence has his choice of either of these two systems of discounts or if he desires he can employ a discount system wherein the rate per foot for any quantity of conduit will be always the same as the rate per foot charged by the jobber or manufacturer for the nearest lower standard quantity. The curve for this system of charg-

ing would assume the shape shown in Fig. 3. In this curve the rate per foot granted for a 500-foot order applies to all quantities of conduit of less than 1,000 feet. Similarly the 1,000-foot rate applies to all quantities of conduit of 1,000 feet or over but under 1,500 feet. In the same way the 1,500-foot rate applies to all quantities of conduit of 1,500 feet or over but under 2,000 feet. It is assumed throughout this discussion that the manufacturer or jobber gives discounts on 500, 1,000, 1,500 and 2,000-foot quantities.

This curve is plotted in the following manner. The points *v*, *t*, *r* and *s*, representing the price of 2,000, 1,500, 1,000 and 500 feet of conduit respectively, are first located. Since the 500-foot quantity rate applies to all quantities under 1,000 feet, a straight line *A* should be drawn from the origin of co-ordinates (the o, o point) through *A* to the 1,000-foot line. Similarly since the 1,000-foot quantity rate applies to all quantities of 1,000 feet and over, but under 1,500 feet, the line *B* is drawn as a prolongation of an imaginary straight line from the origin of the co-ordinates through *r*. Similarly *C* is the prolongation of an imaginary straight line from the origin of the co-ordinates through the point *t*. It will be noticed that short vertical lines are needed to complete a continuous line from *v* to the origin of the co-ordinates. This is, of course, due to the fact that a person must pay more for say 499 feet of conduit than for 500 feet (assuming that the discount granted is greater than the cost of one foot of conduit). In order to bring out the shape of this curve it has been slightly exaggerated, as in practice a curve of the size shown in the figure would not possess such

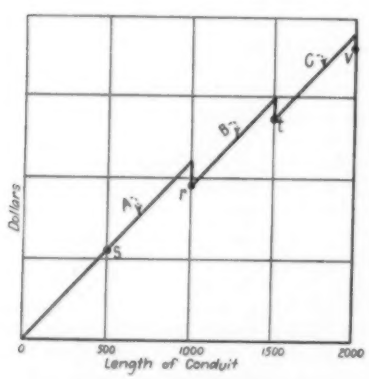



Fig. 3—Another Type of Cost Curve.

long vertical lines. This curve is used in the same manner as the curves in Fig. 1. It must be remembered, however, that for standard quantity rates, the rate corresponding to the lower end of the corresponding vertical line applies, for the short vertical lines represent the amount of the discount.

Before considering Fig. 2 it is best to refer to the dotted part of curve *C* in Fig. 1. It will be noticed that the prolongation of the curve *C* actually gives a cost of 65 dollars for a zero length of conduit. This is due to what would correspond to a rapid increase in cost of conduit in small quantities.

Fig. 4—A Typical Slide Rule.

For this part of curve *C* one has to determine how he wishes the discounts to vary. The full line from the origin of the co-ordinates to point *f* gives rates directly proportional to the 500-foot rate.

The fact that the curve *C* takes the dotted shape as shown in Fig. 1 well illustrates the difficulty of obtaining a fair system of discounts, for if discounts are inversely proportional to the quantity of material sold the price of small quantities becomes excessive. The cost of zero length of conduit is shown as 65 dollars on the dotted portion of *C'*. This is due to the fact that the same law of variations of discounts was assumed to hold true throughout.

Turning now to Fig. 2 it is seen that only part of curve *C* in Fig. 1 is shown. This course should be taken whenever a dealer buys conduit in very large quantities. In such a case the divisions on the cross-sectional paper must represent a great number of feet and a great number of dollars. As one can only estimate with any degree of accuracy to one-tenth of one division, this method of determining costs would not be likely to give accurate results when one division represents a large number of dollars. Hence it is necessary to enlarge the curve in the manner shown in Fig. 2. By drawing several parts of curves in this manner a series of curve sheets that will give accurate results is possible. It should be remembered, however, that the lower left hand corner of the sheet represented in Fig. 2 is not the origin of the co-ordinates (the *o*, *o* point), but the point representing the cost of 1,000 feet of conduit in the case under consideration. Hence it would be impossible to plot a curve of the type shown in Fig. 3 unless the location of the origin of co-ordinates (the *o*, *o* point), is determined or unless intermediate points were found by calculation and plotted. As only one point would have to be calculated between each pair of points determined by the prices quoted by the jobber or manufacturer, very little additional work would be involved in plotting curves for the system of discounts illustrated by Fig. 3.

These curves, of course, can be drawn for other material besides conduit and used in the same way. If such curves are not considered as giving the cost of the material with the degree of accuracy desired even when the curves are enlarged, they will be found of great value as short-cuts in checking estimates. It must be remembered, however, that time represents money and that a saving in time may compensate for any inaccuracy resulting from the use of curves. This is a question the contractor himself must decide, for he alone knows the value of his and his assistants' time. His decision should be based on the fact that values on curves can be estimated with good accuracy to one-tenth of one division, and that very little time is required to plot accurate curves.

Many contractors have found the adding machine a great help, but few make use of the slide rule with which one can perform problems involving multiplication, division, squares and square roots, cubes and cube roots, etc. One of these rules is shown in Fig. 4. They are in extensive use in almost all engineering offices, and as the 10-inch, or recommended size for most work, costs only a few dollars they should prove invaluable to the electrical contractor. It is needless to give an explanation of the operation of these rules, as directions are always furnished, but suffice it to say that with one of these rules the electrical contractor can perform all the mathematical work involved in his work except the operation of addition

Slide rules are invaluable for making quick computation and can be relied upon to give three significant figures with accuracy, regardless of the number of ciphers before or in back of the decimal point. The value of a slide rule in the office and on the job is hence apparent, the rule being as great a convenience to the electrical contractor as to the engineer.

Many other methods of obtaining greater efficiency in one's organization will occur to the electrical contractor who gives the matter serious thought. No contractor can say that his organization is 100 per cent efficient, and hence no contractor can afford to disregard the subject of efficiency. It would take two men with efficiencies of 50 per cent to equal the ideal man of 100 per cent efficiency. The same relation holds true in business and no electrical contractor can afford to neglect today's watchword—efficiency.

## VEDDER ELECTRIC COMPANY.

### A Short Account of the Rapid Growth of the Company.

Success in the electrical contracting business is largely dependent upon the policies of the contractor during the formative period of his business. First-class work, although the most important factor that enters into the subject of success, is not the only requirement. One must also adopt proper bookkeeping methods, recognize the value of association and aim to maintain a high credit standing, for the stability of any business depends upon its foundation, the underlying policies of the promoter.

Many entering the electrical contracting business aim to maintain high standards of work and to adopt proper policies and methods, but, through lack of experience, fail to reach the ideals that they have set for themselves. As a result some meet with failure while others obtain only partial success after very stormy careers. To such men the experiences of successful contractors during the formative periods of their businesses are invaluable.

This short sketch of the Vedder Electric Company, Cleveland, O., aims to give at least a little help to the struggling electrical contractor.

The Vedder Electric Company, under which name G. S. Vedder conducts an extensive electrical contracting business in Cleveland, has yet to celebrate its second birthday. During the first year, the company's business amounted to $80,000 and Mr. Vedder expects the volume of his business this year to double its former amount.

G. S. Vedder, although in electrical-contracting business for less than two years, has been identified with the electrical business for 23 years. Mr. Vedder was first employed by the Adrian Light & Power Company, Adrian, Mich., and later entered the employ of the Cleveland (O.) Electric Illuminating Company. After remaining in the employ of this company for seven years he became electrical superintendent of the docks of the M. A. Hanna Company between Cleveland and Duluth.

Later he entered the amusement field, being identified in an electrical capacity with the White City amusement park near Cleveland, O. After being engaged in this work for three years, he entered the employ of the General Electric Company, being employed in electrical installation work throughout the country.

At the end of four years' experience in electrical installation work Mr. Vedder decided to enter the electrical-contracting business. It was in September, 1914, that Mr. Veeder reached this decision. Starting with a capital of $500 and a 10-by-12-foot office he decided at once that success could only be obtained by building his business upon a substantial foundation.

For the first six months Mr. Vedder attended to all the details of the business himself and employed 15 men to perform the work. From the first he aimed to secure a good credit standing, discounting all bills. Mr. Vedder also realized the great value of the educational features and the associations afforded by membership in the National Electrical Contractors' Association and the Cleveland association, and joined them at an early date.

At the end of the first six months' business Mr. Veeder found it necessary to seek larger quarters and to employ a bookkeeper to relieve him of some of the burdens incident to his rapidly growing business. Later the company was forced to seek larger quarters, removing to its present location in the Pythian Temple Building, one of the buildings that the company has wired during the short period of its existence. At the present time a superintendent of construction, an estimator, a bookkeeper, a stockman and 28 men are employed.

G. S. Vedder.

The superintendent of construction looks after the material and the various jobs underway, seeing that the time limits for construction work of different nature are maintained. The estimator serves as a check on the superintendent of construction, seeing if the various jobs are progressing at their proper rates.

Upon obtaining plans for new work from an architect, the estimator figures the quantity of material and the amount of labor required. This estimate is handed to the bookkeeper, who prices all material, etc., after which the estimate is returned to the estimator for checking. After any errors have been rectified and the total cost of the work figured out, the items are added on an adding machine for verification. The estimate is then handed Mr. Vedder for his approval. As a result of the checking methods employed an error in an estimate is almost an impossibility.

The bookkeeping system employed by the company requires a monthly check on every job, a trial balance being drawn on all the work under way, thus permitting the state of each month's business to be known.

Material is bought in car-load lots, thus enabling the company to obtain quantity prices. Advantage is also taken of periods of low prices in buying. The stock room of the company is located in the basement of the building and connected to the offices by an intercommunicating telephone system. At the present time the company is maintaining about a $5,000 stock of supplies.

Mr. Vedder specializes in heavy construction work such as commercial lighting and power installations and central-station work. Among the large buildings wired by this company in the city of Cleveland are the Miles Theater, the Cleveland Street Railway Shops, the William Taylor Son & Company's store, the S. S. Kresge Company's Euclid-Avenue store, the Pythian Temple Building, the Pilsner Brewery, etc.

Mr. Vedder takes an active interest in all things tending to better conditions in the electrical contracting business and aims to attend all electrical conventions regardless of distance. At the present time Mr. Vedder is actively engaged in the movement to better the electrical code of Cleveland and in the movement to obtain a state license law.

He is an active member of the National Electrical Contractors' Association, the Cleveland Electrical Contractors' Association, the Society for Electrical Development and the Jovian Order.

Mr. Vedder believes that the electrical contractors of Cleveland are well organized and that a general spirit of good will exists among all the legitimate contractors of the city.

## A Giant Belt in an Austrian Mining Plant.

What is said to be the largest leather drive belt in the world was recently installed in an Austrian mining plant. The belt has a length of over 206 feet and a width of 3.6 feet. It transmits 2,650 horsepower and travels at a speed of 92 feet per second. In the manufacture of this belt there were used the middle portions of 620 ox hides, which were glued together in four superposed layers. To render the belt waterproof, a special tanning process was used.

### Keeping Out of the Rut.

Success in any business depends upon the adoption of modern methods, a knowledge of the charges being made in the elements constituting that business, and the will power and the ability to take up new ideas.

In this age of invention it behooves the electrical contractor to keep abreast of the times for otherwise he will soon be termed as old fashioned or in the rut. Every year witnesses the development of new devices and new products by the electrical manufacturer. To refuse to remain abreast of the times and to learn about each device and its uses is business suicide. The contractor, who gets into the rut of past times will soon find that his business has appreciably decreased.

The best way to keep from sinking into the rut is to remember the old saying, "It is easier to keep up than to catch up." A study of each device and a study of each new installation of that device should be made at one's earliest opportunity. To be sure that one will keep out of the rut all that is necessary is to be sure that one is not gradually sinking into a rut.

H. A. Birdsall.

### Louisville Wiring and Fixture Firm Ready to Drop Gas-Fixture Business.

Confusion and annoyance resulting from the similarity of names, has resulted in the Louisville Gas & Electric Fixture Company amending its charter, so as to change the name to the Louisville Wiring & Fixture Company. The concern is four years old and since it was organized, the merger of the Louisville, Ky., utilities has resulted in the Louisville Gas & Electric Company. So much confusion resulted, some of the calls for the one going to the other, and vice versa, that the contracting concern decided to change.

As a matter of fact, according to Thomas O'Leary, secretary of the Wiring & Fixture Company, the new name describes the business better than the old since there is almost no gas-lighting fixture business nowadays and the company is preparing to do away with all the gas-fixture stock it has on hand.

### Chicago Considering Outdoor Electrical Life Hazards.

The Chicago Department of Gas and Electricity has now investigations under way with the object of formulating rules which would tend to reduce accidents from electrical causes on pole lines, and other types of outside construction. It is hoped that this work can later be extended to include an investigation of the life hazard connected with inside electrical work.

### Electricians to Get More Pay.

Under the terms of an agreement between the executive committee of the Topeka, Kans., Electricians' Union and a committee of the electrical contractors, the electricians, now receiving $4 for an eight-hour day, will get $4.25 a day after January 1, 1915, and $4.50 after January 1, 1916. The agreement is for three years.

### Among the Contractors.

The Avery-Loeb Electric Company, Columbus, O., contractor and dealer in supplies, is doubling its floor space. It will utilize six floors, giving a total of 15,000 square feet. One story will be devoted entirely to Westinghouse products, of which the company is wholesale distributor at Columbus. Another story will be given over to Shelby Lamp Company goods. In these two lines the Avery-Loeb trade will have the advantage of what are virtually warehouse resources, in the way of volume and variety of supplies carried. Other departments will be rearranged to meet the needs of enlarged operations. The company has been in existence about four years. Its methods in the past have been a factor in rapidly developing the electrical business of Columbus.

C. H. Norwood, Chicago, Ill., has the contract for wiring for light and power and the installation of the motors on the motor-driven draw bridge over the Chicago river at Chicago Avenue.

J. P. Foster has taken over the business of the C. R. Burgess Electric Company, Newcastle, Ind.

Henry Newgard & Company, of Chicago, Ill., has the contract for installing a number of large motors for Kolin Brothers, 400 North Elizabeth Street, Chicago.

An automobile belonging to the Avery-Loeb Electric Company, Columbus, O., was stolen from in front of the latter's place of business on August 13. Retribution came to the thief very swiftly. Before driving three squares he collided with another machine and was thrown into the street. His injuries were so severe that he was taken to a hospital in an ambulance, to which place he was soon traced by the police. The culprit proved to be a young man recently released from the State Reformatory. The automobile was badly wrecked.

The Lewis Electric Company, Chicago, Ill., will install several motors at the plant of the National Lead Company, 900 West Eighteenth Street.

The United Electric Construction Company, 1727 Samson Street, Philadelphia, Pa., has the contract for wiring the new building for the Ford Motor Car Company, Atlanta, Ga.

The contract for wiring the new Young Men's Christian Association building at Nineteenth and Paseo Streets, Kansas City, Mo., was awarded to the G. G. Burkholder Electric Company, of that city.

F. L. Decker, Chicago, Ill., will wire the building now under construction for the Illinois Central Railroad at Fifteenth Street and Indiana Avenue, Chicago.

The Richardson Electric Company, Duluth, Minn., is wiring a large paper mill at Cloquet, Minn.

Electrical work in a new agricultural and manual training building at the State Normal School, Kent, O., has been awarded in a $3,500 contract to the McKeever Electric Company, Columbus, O. It covers wiring, lighting, and everything complete for the installation of motors and telephones. The McKeever Company is also at work on the library building for this institution, the wiring contract for which it secured some weeks ago. The same company has the wiring contract, amounting to about $500, for the new office building of the Columbus Iron & Steel Company.

Blumenthal Sons & Company, Chicago, Ill., will wire the Angel Guardian Orphanage, 2001 Devon Avenue, Chicago.

The Home Electric Construction Company, Macomb, Ills., has recently closed contracts for wiring the new Macomb high-school building and also for the wiring and motors for the new addition to the Macomb Sheet Metal Works. The high school includes conduit, wiring for motors, lights and clock system.

John S. Nicholson, of Washington, Pa., has opened up a general auto-ignition and wiring business at 156 South Main Street.

L. K. Comstock Company, Chicago, Ill., will wire the new building being constructed for the University of Chicago. This contract involves wiring for 600 lamps and 4 motors.

Ray Lilley and Herbert Hime, Freeport, Ill., have entered the electrical repair business. They will not do wiring, but will confine themselves to repair work of all kinds. Both are experienced electricians, and should make a success of their new venture.

# National Association of Electrical Inspectors.

THOMAS HENRY DAY, President. 59 Deerfield Avenue, Hartford, Conn.
H. S. WYNKOOP, Vice-President, Municipal Building, New York, N. Y.
WILLIAM LINCOLN SMITH, Secretary and Treasurer, Concord, Mass.
JAMES E. COLE, Representative on Electrical Committee of National Fire Protection Association, City Hall Annex, Boston, Mass.

*Executive Committee*
EUGENE N. DAVIS, Chairman, Brookline, Mass.

SECTION REPRESENTATIVES:
C. H. Fletcher, H. Burnes, British Columbia.
A. W. Hopkins, G. W. Perry, Western New England.
Washington Devereux, A. H. Lilley, Philadelphia.
E. N. Davis, H. A. Knight, Eastern Massachusetts.
C. A. Hannan, O. E. Smith, New York City.
C. W. Mitchell, John W. Carrell, California.

MEMBERS AT LARGE:
George L. Collison, Frank R. Daniel, James H. Fenton, F. G. Hartwell, J. E. Latta, James B. McCarthy, Thomas D. MacColl, A. A. Moffitt, R. P. Strong

"LET THE CODE DECIDE."

### Secretary's Message.

The summer season is now in full swing and that the Secretary regrets to have to record this fact is made evident by the appearance of only 13 replies to the questions which appear in this issue, 12 of our Executive Committee members not having as yet replied to the Secretary's letter of questions of July 15.

Our representative on the Electrical Committee, and Past-President, James E. Cole, has made a wild endeavor not to be outdone by Vice-President Wynkoop and has moved from his former headquarters on Wareham Street, Boston, Mass., to the new City Hall Annex, Boston, where he is now situated pleasantly on the ninth floor.

The difference between Boston and New York is, however, apparent in the fact that brother Wynkoop is still 14 floors ahead.

Members will please take notice of Mr. Cole's change in address, it being now Commissioner of Wires, City Hall Annex, Boston, Mass.

The Secretary recently inspected quite a unique electric lighting plant which he had hoped to describe here. However, certain private matters combined with the season have prevented his getting at the business of writing till so late that it must lie over till the next issue.

**The matter appearing in this section consists of questions on the National Electrical Code, its interpretation and meaning, and questions as to whether certain methods of wiring are in accord therewith. These questions are gladly received from anyone interested, even if not a member; they should be sent to the secretary with any needed elucidating sketch. They are answered by each member of the Executive Committee according to his knowledge of what the ruling would be in his jurisdiction.**

**It should be understood that no pretense is made to give an authoritative interpretation of the Code. This is a voluntary association; it has representation on the Electrical Committee of the National Fire Protection Association, which prepares the Code, but it has no right, and claims no right, to give a final interpretation of anything in the Code. It is only intended to give the interpretation which seems correct to the members of the Executive Committee. No attempt is made to edit or correlate the answers from the different members of the Committee, as it is felt that the occasional difference of opinion is calculated to lead to a further study of the matter in question, further discussion and the final clearing up of obscure points.**

**The aim is to help toward a better understanding of the Code on the part of all; a more uniform conception of its meaning; increased precision in applying it; and harmonious action of those using it, for the common good.**

### Running Ground Wire in Same Conduit as Service Wires.

**Question 270. Is it permissible to run the ground wire in the same conduit and with other wires of the same system?**

Answer 1 (O). The Code rules do not prohibit this construction. There would be no more reason for objecting than there would be in the case of the grounded neutral of a three-wire system.

Answer 2 (A). I do not think it is permissible, nor that it is permissible to run the wire in pipe except the pipe is buried, or in short pieces for mechanical protection.

Answer 3 (H). I should say not, as the function of a ground wire is to carry an excess of current directly to ground and should be kept absolutely away from the wires through which the useful current passes.

Answer 4 (E). There is nothing in the Code rules to prevent this installation, except that the conduit within which the ground wire is installed, should not be concealed. I question, however, whether many inspectors would encourage such a construction.

Answer 5 (P). Yes, if the ground wire cannot be kept outside the building, Rule 15*c*.

Answer 6 (U). There is no rule to prevent it, except that if it can be run straighter by being run separately, the rules would so require it.

Answer 7 (R). There is no specific rule to prevent it, but it is bad practice and should not be encouraged.

Answer 8 (Y). No specific rule prevents it.

Answer 9 (V). Ground wire should not be run in same conduit with other wires beyond the service switch and cutout, as there is liable to be impressed on this wire a potential equal to that of the primary feeding the lines. On direct-current lines where it is not likely they will later be called upon to carry alternating current and where the wires are all underground, I see no special harm. I mention underground because this ground wire, on overhead lines, is sometimes likely to transmit lightning.

Answer 10 (B). Presuming that the ground wire referred to is in connection with the secondary system, and not for conduit or other purposes, should occasion arise I would see no particular harm in doing this, though in this city the system of grounding is such that there is no occasion for so doing.

Answer 11 (F). Yes, if the insulation be the same as on the other wires, a ground wire in grounding of the conduit system would be permitted in the same conduit with other wires. A ground wire for a lightning arrester would not, however, be permitted to be installed in this manner.

Answer 12 (S). I find nothing in the Code to prevent it, and should allow it.

Answer 13 (N). Only two points bear on the matter in the Code provisions,—the the ground wire be run as direct as possible and that it should not be concealed. Provided these two provisions are reasonably complied with, I can see no reason for objecting to the presence of the ground wire in the conduit with other wires of the same system any more than of the neutral wire to which the ground wire is attached.

---

### Grounding of Aerials for Wireless-Telegraph Apparatus.

**Question 271. In the case of very high buildings, Rule 86*a* which requires aerials for wireless telegraphy to be grounded on the street side of the water service cock, imposes considerable**

**hardship. This might frequently be removed, at least in the case of steel-skeleton buildings, by grounding on the frame itself, of course, being careful that all pipes are bonded to the steel work on the floor where the ground wire is attached and also in the basement. Would such a construction be considered proper?**

Answer 1 (O). I should rule that it would comply with the sense of the requirement.

Answer 2 (A). It depends on what you consider a very high building. In one of, say, 40 stories it would be permissible to attach to the water pipe on the top floor and bond the meter. I have not a doubt but that one would find the pipe and frame in contact somewhere going down.

Answer 3 (H). Under certain conditions yes, if the skeleton of the building were carried to permanently moist earth.

Answer 4 (E). Yes. But I would further suggest that the skeleton of the building be further grounded to the water-pipe system ahead of the main cock.

Answer 5 (P). I fail to see why it would not be proper to use the steel skeleton as a ground if proper attention is given to the bonding. Aside from the difficulty of securing the proper installation of a ground wire, there would also remain a doubt as to its integrity.

Answer 6 (U). I think it would be proper, provided it is carried out as suggested.

Answer 7 (R). Yes.

Answer 8 (Y). Would consider that the steel work of the building would be equal to the water pipe.

Answer 9 (V). Should consider this form of ground good practice.

Answer 10 (B). Provided that the bonding suggested is properly done, it would appear to me that the proposed method would give satisfactory results.

Answer 11 (F). The rule quoted does not absolutely require grounding on the street side of water connections. While the rule suggests this it also anticipates other equally satisfactory earth connections where this requirement cannot be met.

Answer 12 (S). I should approve such an arrangement if bonding were carried out as suggested.

Answer 13 (N). I can see no possible objection, provided the steel work makes a good earth contact, but where this might be doubtful should further bond the frame to all water connections on street side of shutoffs.

# Public Service Commissions

**Conducted by William J. Norton**

## ARIZONA.

**Court Case.** The right of the Arizona Corporation Commission to regulate public utilities owned by individuals was upheld by the United States Circuit Court, sitting at San Francisco, Cal. The Commission had issued an order reducing the rates of the Granite Springs Water Company which serves Miami. Upon appeal to the court, the contention was made that the company is privately owned and therefore not a public service corporation. The court upheld the jurisdiction of the Commission to regulate the company's rates.

## CALIFORNIA.

**Vallejo Light & Power Company.** In a decision rendered August 14, the Commission considers the question of just rules and regulations to be observed by the consumers and the company. The principal point of difference between the petitioners and the company related to the matter of extensions. The company contended that it should only be required to make extensions when such extensions would show a profit.

The Commission's opinion says: "This, of course, is not the proper basis upon which to determine whether or not extensions shall be made. The business of the utility, as a whole, should be considered, and if the extension is otherwise proper, the result of the extension upon the entire financial status of the company should be considered, rather than considering the extension as a separate venture. The privilege which this company has of using all of the streets of Vallejo should carry with it the obligation to extend to all parts of the city at its own expense, unless it be shown that such extensions would be unreasonable and unjust."

The attention of the company was also called to the fact that the Commission had denied its competitors entrance into the city upon the theory that it would perform its full obligations to the public, and that if the company saw fit to avoid its responsibilities and to ignore this obligation, it might become incumbent upon the Commission to admit competition in order that the citizens may be properly served.

**Pacific Gas & Electric Company.** The complaint against the company filed by the Rosenberg Company, of Hayward, has been dismissed. The complainant stated that business had fallen off to such an extent that it seldom had occasion to operate its motor but that it was required to pay a minimum charge of $15 per month, and asked that this charge be reduced. The Commission in its opinion, says: "While it is unfortunate if the business conditions of a firm or individual are such that it feels it cannot afford to pay an existing rate, this fact alone cannot induce the public authorities to establish a deviation in favor of such firm or individual."

## ILLINOIS.

**The Chicago & Western Indiana Railroad Company.** In denying the company's application for authority to issue $3,000,000 of collateral-trust gold notes and $6,000,000 of first and refunding-mortgage bonds, the latter issue to be used as collateral security for the issue of notes, the Commission held, in an order rendered July 24, 1914, that the purpose for which the petitioner desires to issue the refunding-mortgage bonds is not one of the purposes specified in Section 21 of the Public Utilities Law and therefore cannot be lawfully authorized. The petitioner did not desire to issue the notes unless the issue of bonds as security was authorized and the Commission dimissed the application.

This order was vacated and set aside in an order issued July 31. After making the same statement of facts as in the former order, the Commission again denies the application and points out that according to the financial statement submitted by the petitioner there should be unexpended capital funds of the company, to the amount

of $2,615,394.63 and that the evidence shows that petitioner has improperly used a large portion of such capital funds in the payment of operating expenses and dividends.

## NEW JERSEY.

**Public Service Electric Company.** The Board has approved the lease of the Bordentown Electric Company to the Public Service Electric Company for a period of 46 years.

The lease of the Cinnaminson Electric Light, Power & Heating Company to the Public Service Company has also been approved.

**Delaware & Atlantic Telegraph & Telephone Company.** The ordinance of the town of Phillipsburg permitting the telephone company to use the highways for its purposes was approved by the Board.

**The New York Telephone Company** was granted an ordinance permitting it to use the streets of South River and the ordinance has been approved by the Board.

## PENNSYLVANIA.

**Consumers' Electric Company.** The Commission dismissed the application of the Borough of Exeter asking for approval of a franchise ordinance granted the Consumers' Electric Company. The purpose of the franchise was to give the company the right to furnish service in the borough in competition with the Citizens' Electric Illuminating Company. In refusing to grant its approval, the Commission points out the results of such competition and concludes as follows: "It is evident, therefore, that the action of a municipality in granting franchises to competing public service companies, as compared with that of rate regulation by state authority, may produce the contrary effect of increasing rates for service by a public utility, although the opposite result is sought to be obtained by the means of competition; and, it would appear that a rate-regulating body, by authorizing or approving competition, may place itself in the anomalous position of voluntarily creating a situation that results in unnecessarily high rates. The ultimate effect upon the rates is the essential point to be determined after a due consideration of all the facts of a situation." Adequate provision for the regulation of the rates and service of the company furnishing the service under monopoly conditions is vested in the Commission.

Mention is made of the rules prescribed by the Commission, April 9, fixing standards of service and the decision says that the Commission is about to notify all public service companies "to, at once, procure the apparatus and equipment necessary for and to inaugurate the system of keeping the records of their service and inspection as provided for in the said Service Rules."

## WISCONSIN.

**Standards for Telephone Service.** The Commission has adopted a set of rules fixing certain standards of service for telephone companies to become effective within sixty days from the date of the order. The order was issued August 14, 1914. This is the first utility commission to announce standards for telephone service. The rules provide that the equipment and lines shall be so constructed as to eliminate all cross-talk and noise; that the number of subscribers on any one line should be limited to a number consistent with adequate service; that there shall be at least one line for through traffic between cities and villages, along which few, if any, subscribers' instruments are installed; that the lines and instruments shall be maintained in proper condition and repair; that switchboards shall be of adequate capacity, and that, in all exchanges serving 500 or more subscribers, 94 per cent of the calls shall be answered in ten seconds or less. The rules also provide that instruction shall be given covering the phraseology and methods to be employed by operators in handling regular and special calls; that directories shall be issued semi-annually and that every effort shall be made to eliminate trouble on the lines immediately.

These rules, in tentative form, were made public nearly a year ago, but have been revised in the light of suggestions made at a conference, between the Commission and the telephone men of the state, held last February.

**The Cornell Telephone Company** made application to the Commission for a certificate of necessity and convenience to extend its lines in the town of Holcombe. Objection was made to the proposed extension by the N. H. Denel Telephone Company and the Chippewa County Telephone Company. It developed, during the hearing of the case, that the Cornell Telephone Company had already built the extension, on the assumption that Holcombe was an incorporated village and that for this reason it would not be necessary to obtain a certificate from the Commission. Upon finding that the place was not incorporated, the application was made in order to conform to the statutory requirements.

The Commission proceeded in this action as if no line had been built and decided that the duplication of lines in the town of Holcombe was unnecessary. The Cornell Telephone Company was ordered to discontinue service to the subscribers upon the extension.

**The Grange Hall Telephone Company** applied to the Commission for a certificate authorizing it to extend its lines in the town of Rock Elm, Wis. Objection was made by the Highland Telephone Company. The applicant had previously brought the matter to the attention of the Commission but had stated that the proposed line did not interfere with any other company. The Commission, in accordance with this information, granted a permit to build the line. As soon as active construction began, the Highland Telephone Company sent in an objection, stating that it had not been notified of the proposed extension, as is provided for by the statute, and that the line in effect paralleled its lines for a distance of three miles.

Upon receiving this information, the Commission reopened the case and the Grange Hall Telephone Company was instructed to make another application fully stating the conditions surrounding the construction of the new line. This case was tried on its merits. The Commission found at the time of hearing that the applicant had not awaited its decision in the matter but had built the extension and had, in fact, given service to former subscribers of the Highland Telephone Company. It justified its action upon the ground that the subscribers, by building and maintaining their own section of the line, would secure a rate of $3.00 per annum instead of a rate of $12.00 per annum, the latter being the charge of the Highland Telephone Company.

The Commission pointed out that a saving may not be effected in this manner even though the actual annual cash outlay to the telephone company may be less. The subscriber must add, in the case of the line under investigation, not only the maintenance cost on the wire but also the expense of battery renewal, and interest and depreciation on the investment. The Commission further stated that an annual charge of $12.00 per year for rural service did not appear to be unreasonable, and, even if it were, the proper procedure would be an action before the Commission asking a review of the rates instead of building a new line.

The Commission has granted the applicant two weeks in which to discontinue service. If service is not discontinued within that period of time, the matter will be turned over to the Attorney General for prosecution.

**The Decisions and Opinions** of the Commission issued between November 13, 1912, and May 19, 1913, are now available as a volume of 889 pages.

## Transcaucasian Electric Railway.

One of the most important electrical projects that has been delayed by the present military activities in Europe is the proposed electric railway crossing the Caucasus Mountains between the Black and Caspian Seas in southeastern Russia. This high mountain range, which forms a formidable barrier between these two large seas, has not yet been crossed by any railway line. North of the mountain range is the city of Wladikawkas, which is distant from the city of Tiflis south of the mountains only 124 miles in a direct line. Communication between the two cities must now be carried on by passing along the coast of the Caspian Sea, this roundabout route having a length of about 930 miles. The proposed railway across the Caucasus Mountains will therefore make a very decided reduction in the distances of not only these two cities but bring the Russian province of Transcaucasia nearer to the main portion of the Empire and at the same time more readily permit the development of the northern part of Persia, which Russia has lately undertaken.

The proposed railway will rise to a height of 4,430 feet above sea level and then will penetrate the mountains through what will be the longest tunnel as yet constructed; this will have a total length of close to 14.6 miles. The tunnel section of the proposed line is the feature that has delayed its construction from time to time, but the successful construction and operation of the Simplon Tunnel and other tunnels through the Swiss Alps makes the project much more practicable. The cost of the proposed system, exclusive of electrical equipment thereof, has been estimated as close to $53,000,000. The Russian Government has already appropriated 1,000,000 rubles or $515,000 for the preliminary work.

## Electric Railways in Argentina.

There were 666 miles of electric railways in Argentina in 1913, 476 of which were located in the city of Buenos Aires, and the remainder in various provincial cities.

Passengers carried by the Buenos Aires lines in 1913 numbered 423,661,587, an increase in round numbers of 31,000,000 over 1912. Eighteen additional miles of track were laid in the capital during the year. The first section of the Underground Electric Tramway, or subway, begun in 1911, was opened December 1, 1913. This section is about two miles in length, and extends from the Government House, near the river, to Plaza Once, in the center of town. The subway is double-tracked, with stations every three squares.

## California Association of Electrical Contractors and Dealers, Fifth Annual Convention.

The fifth annual meeting of the California Association of Electrical Contractors was held in Sacramento, Cal., August 4-8 with headquarters at Hotel Sacramento. This convention, in point of attendance and enthusiasm, was the most successful of any in the history of the association. For the work actually done and on the entertainment side, this meeting will be long remembered. The slogan of the convention was co-operation and the faithful work of its members, the delightful social side, the large attendance and the able papers read, mark this association as one of the most progressive in the country.

### Opening Session.

The convention opened Tuesday, August 4 with the gathering of the Executive Committee, holding two meetings at 9 a. m. and 2 p. m. Reports of committees were accepted and filed as given in the following paragraphs:

The report on compensation insurance for the entire state, while showing that no better rates had been obtained, showed that much had been done, including better settlements as well as better conditions.

The Segregation Committee reported much progress in getting work for the electrical contractor from the general contractor, thus making it somewhat easier for the former class.

The reading of the report of the Joint Committee resulted in the adoption of a set of by-laws governing the electrical contractor's association, such as rules dealing with securing the approval of the Department of Justice and local authorities, state or municipal, the relation of the contractor to the central station, the electrical engineer, the jobber, the manufacturer and the architect and the distribution of electrical material.

The Power Committe's report referred to sales of electrical appliances, which should be given more largely to the electrical contractors.

The Legislative Committee reported on city ordinances, state licenses and segregation. The work done along the lines of standardization has been very successful, particularly with respect to getting the engineers of the Pacific Telegraph & Telephone Company operating along the Pacific Coast, to recognize the necessity of a standard specification and standard materials for wiring of buildings for telephones.

### Contractors, Jobbers and the Central Station.

The first paper read at this session was read by W. W. Briggs, manager Great Western Power Company, San Francisco. Mr. Briggs' subject was "Contractors and Jobbers with Reference to the Central Station." He advocates a publicity bureau to teach people who are ignorant of electrical matters and methods. One should defend the interests which one represents and the public should be educated along these lines. A shut down of the central station, Mr. Briggs says, affects the contractors as well as the public and other electrical interests. Mr. Briggs advocated a weekly exchange of ideas between central-station men and contractors, saying that he felt that both would be benefited thereby.

### Manufacturer, Contractor and Jobber.

The second paper was by Carl Heise, manager of San Francisco office of the Westinghouse Electric & Manufacturing Company. Speaking from the standpoint of the manufacturer on the subject, "Co-operation between the Manufacturers, Contractors and Jobbers," he defined co-operation by an illustration of the harmonious and co-operative action of the organs of a healthy human body. The profit of the central-station man is continuous, while the contractor obtains his profit from the original installation. The electrical manufacturers are trying to standardize their products and are co-operating with the Society for Electrical Development in respect to advertising, etc. Contractors should also follow up the various national advertising campaign, supplementing them by local matters.

The third paper was by T. C. Hunter of the electrical engineering firm of Hunter & Hudson, San Francisco. In discussing his subject, "Co-operation between the Electrical Engineers and the Contractor," he said that a better understanding between the two would benefit both. This is the age of invention and new forms of power are likely to develop in the near future. Appliances and devices are changing in nature every day. Architects need the trained mind of the specialist. Mr. Hunter, therefore, advocates the aid of an engineer's service to architects and owners. The electrical engineer, he says, should decide what is wanted to make good contracting work possible.

### Co-operation of Jobbers.

The fourth paper was read by Col. Carter, of Oakland, on "Co-operation of the Jobber." He advocated better co-operation on the part of the central station. The central stations in California are recognizing the other men in the industry, particularly so in the northern part of the state, but in the southern part of the state there is still room for improvement. He says that those that fight the hardest

for business are often the best friends. One should attempt to learn the names of the good and the bad in the various phases of the electrical business. The only way to cure jobbers of bad practices is to get them into the Association, giving them practical advice, saying that the reputable jobbers cannot do certain things. In concluding he said that jobbers as a rule aim to maintain the ethics of the business.

**Faults of the Contractor.**

The fifth paper was by C. F. Butte, of the San Francisco electrical contractor's association. His subject was "Faults of the Contractors." He said that the subject closest to the contractor is association work. He says that a contractor must know how to estimate to advantage, the use and handling of materials, how to collect his accounts, how to get new business, etc. A standard is needed in estimating. The public should be educated along some electrical lines and the architect as well. The contractor should give good service, take due account of work and expense and be efficient. He should also, Mr. Butte said, aim to make economical purchases for hand to mouth purchasing is extravagant. The contractor, he says, should also play fair with the men in their employ. He also advocated the standardization of material. Mr. Butte then made a plea for the Sons of Jove, saying that their principles were beneficial to the electrical-contracting business.

Group at California Contractors' Convention.

Albert Elliott, attorney of San Francisco, then spoke on Co-operation. Mentioning the war in Europe he compared it with the internal war in the electrical business. There is the sphere for the manufacturer and a sphere for the electrical contractor. Neither of these can be short-circuited for each has its functions to perform. There are always some who never obey the law but they are in a minority, and there are certain economical laws governing business. Success depends on both. The object of the convention he said was to get together and solve the problems of co-operation. Association, he said, develops self-interest, instead of selfishness.

All of the papers were received with enthusiasm and evidently much appreciated by those fortunate enough to be present.

**Election of Officers.**

On Thursday, August 6, the election of officers took place, the following officers being elected:

President, C. V. Schneider (re-elected), Sacramento.

First Vice-President, L. R. Boynton, San Francisco.

Second Vice-President, L. Gilpin, Oakland.

Third Vice-President, Frank Somers, San Jose.

Fourth Vice-President, C. Loveday, Santa Barbara.

Fifth Vice-President, J. C. Rendler, Los Angeles.

Secretary, W. S. Hanbridge, San Francisco.

It was decided to hold the 1915 convention in San Francisco.

**Entertainment Features.**

On Wednesday, August 5, at 8:00 p. m. a reception and dance was held at the Sacramento Hotel. During the evening G. C. Holberton of the Pacific Gas & Electric Company, exhibited a series of lantern slides of the Lake Spaulding dam.

Thursday, August 6, all enjoyed an automobile ride to Folsom. On reaching the prison the party was shown through the various departments. The party then proceeded to Orangevale Colony where refreshments were served by local residents, everyone receiving a basket of California fruit. The party then went to the Ladies' Club at Fair Oaks where a band of music was waiting and a light luncheon was partaken of. At 8:00 p. m. a large party attended the moonlight ride and dance on the Sacramento River.

On Friday, August 7, the ladies were entertained by a sight-seeing trip about the city in electric coupes. At 7 p. m. the annual banquet was held in the large dining room of the hotel. The tables were beautifully decorated and an appetizing dinner was served. An orchestra and vocal selections by Mrs. Fannie F. Wellman, of New York City, and Miss Elliott, of Berkely, University added much to the entertainment fetatures. Remarks were made by several prominent members and by Mrs. C. V. Schneider. The banquet was followed by the annual ball.

On Saturday the annual outing was held at Smith's Mound on the Sacramento River. A ball game took place between Southern California contractors and the Northern California contractors, the latter winning by a score of 9 to 7.

Saturday evening a Jovian rejuvination, under the direction of G. Stanley Pearce, statesman, was held at the Elk's Hall. About twenty were initiated into the order. Among the initiates were Carl Beaton, chief electrical inspector, Sacramento, and W. Wiley, of West Sacramento Electrical Company.

## Campaign for Hydroelectric Railways in Ontario.

The first meeting in the campaign for hydroelectric radial railways in York and Ontario Counties in Canada was held in Agincourt on August 5 with more than 500 persons present. Reeve J. G. Corbell, Scarboro, was in the chair. He explained that the object of the campaign was to educate the electorate as to the advantages of the proposed new hydroelectric radial railway from Toronto to Port Perry, in order that they could vote intelligently on the by-laws to be submitted by the various municipalities on September 21 to guarantee the bonds for the new line. Sir Adam Beck said that the new road would open many new districts now without any means of transportation and give direct and speedy connection with the city. He expressed himself as confident that a right-of-way could be secured in Toronto.

## Secretary of Interior Urges Immediate Development of Our Mineral and Water-Power Resources.

In view of the serious interference with international commerce caused by the European war and the various proposals for American commercial interests to avail themselves of the peculiar opportunities now presented, the following interview with one of the members of President Wilson's cabinet is of special interest in showing that the administration is fully alive to the conditions and is anxious to aid in every way the development of our resources so as to make this country more independent commercially of the countries across the seas.

"A direct benefit to the United States from the European war will be its effect in making the people of this country realize to a greater extent the value of its mineral resources," said Franklin K. Lane, Secretary of the Interior, in a recent interview. "It is entirely possible to so utilize these resources and expand our industries that the label 'Made in America' will become familiar in our own and foreign markets."

"Of an importance second only to that of the food supply," said Mr. Lane, "is the supply of mineral products necessary to meet the requirements of twentieth century civilization. One of the first effects of the war has been to make us realize the interdependence of nations in the matter of food supply. Most of the countries now at war are dependent upon importation of foodstuffs, and we have cause for self-congratulation in the United States that we are able to feed ourselves. What we possibly have not so fully realized is that we are nearly as independent in the possession of essential mineral resources, and that the interference with manufacturing caused by interruption of the flow of importations of many necessary raw materials, may be overcome almost wholly by development of neglected resources in our own country."

"Do you mean," Mr. Lane was asked, "that the United States can make itself independent of the rest of the world in its manufactures?"

"Very largely," asserted the Secretary. "The main difficulties to be overcome are in the rearrangement of the distribution system necessary to establishing this independence. Business is established along certain well marked channels, and usually follows the line of least resistance. It has been easier, and perhaps cheaper, to import mineral products and materials from other countries than to go to the trouble and expense of developing our own resources of the same nature. Forced to the latter course by suspension of commerce with other countries, I believe that American enterprise and energy will almost at once turn to the development of the native resources, rather than permit production to lag and supply to be diminished in any industry.

"For the maintenance of agriculture, for instance, we rely more and more largely upon mineral fertilizers. The three essential plant foods are potash, nitrogen and phosphorus, the latter used generally in the form of phosphates. We have depended, with the rest of the world, very largely upon the mines of Germany for our supply of potash salts, and war has cut off this supply, but we have large deposits of potash in a California reserve which can be immediately opened and developed if a bill now before Congress to make these supplies available is enacted. Chile holds a practical world monopoly of the most readily available nitrogen in its great nitrate beds, and not only the manufacture of agricultural fertilizers but also of many kinds of high explosives, have been made dependent upon the Chilean supply of nitrates. If this supply should be cut off, a new supply would have to be found or manufactures and agriculture would suffer. Fortunately this new supply is at hand. We can draw nitrogen from the air and fix it with lime by the use of large and cheap electrical development, as is done at Niagara Falls and in Norway, and all that is necessary to pave the way to this electrical development is the passage by Congress of the Ferris bill now pending, which will make possible the utilization of the great unused water powers of the Western States.

"The southern states have for years largely supplied the world with phosphates, but because of the distribution system, a large part of this supply has gone to Europe, and much of the phosphates used in the Western States have been imported across the Pacific. We have some 3,000,000 acres of phosphate lands in the West lying near the smelters from which is produced the sulphuric acid necessary to convert these phosphates into form available for plant food, and still there is no law by which these phosphate deposits can be made commercially available, although a bill which would allow of their immediate development has been favorably reported by the Public Lands Committee to the House of Representatives, and is awaiting the approval of the House and Senate."

"Will these resources be developed if these laws are passed?" the Secretary was asked.

"Of course they will," he replied. "You can depend upon American enterprise and ambition to make good when it is given an opportunity. At present these deposits and resources are locked up out of use. To open them to use when the supply from other countries is cut off means to make American industries using these materials independent of the rest of the world, and business men will not neglect the opportunity to make our industries safe from the interruptions of war we are now experiencing."

"What other industries are there now dependent upon the products of other countries, which can be made independent?" Mr. Lane was asked.

"The steel industry, for one," he replied. "Manganese is of large importance to this industry, and the largest supply of ore comes from Russia and other countries with which commerce is now paralyzed. There are large deposits in South America which have not been developed, but it is not necessary even to go so far away as that. We have great stores of manganese in this country which has been largely untouched because it is somewhat inferior in quality. To bring this home supply into use means merely adoption of methods for its purification, which are known and can be successfully used, and then we can continue making manganese steel without regard to foreign wars or sources of material. There are other international contributions, though, in the steel industry. We have depended largely upon the island of Ceylon for the graphite used in the manufacture of the crucibles in which crucible steel for edge tools and small firearms is made. Or to take another metal, European smelters, using in part Chinese and Mexican ores, have in late years furnished much of the world's supply of antimony, which is used in the manufacture of type metal, and also medicinally. War has paralyzed the production of antimony in England (at Newcastle), and prices have gone up, Antimony, however, is easily extracted from many low-grade ores which we have in great quantities in at least seven states, and there is no reason why we should not make this extraction and be independent of other countries, both as to supply and prices. Similar conditions hold in the case of arsenic.

"A large tonnage of ferromangese alloys comes from Germany and England. It is only in the last ten years that we have freed ourselves from Sicily's monopolistic control of the sulphur supply. Flint pebbles are common and the supply large enough in the United States, but for such an apparently unimportant product as these, used in the fine grinding of

cement and ores, we have been depending upon the chalk cliffs of England, Denmark and France. Ores and mineral freight depend almost wholly upon the tramp steamer, a carrier of foreign parentage. Now the tramp steamer has taken to cover, and all kinds of ocean freight, especially low-grade freight, will be held up and its carriage almost entirely suspended during the war."

"Will this suspension mean disaster to our industries?"

"Not disaster, but inevitable interruption to some extent," replied Mr. Lane. "It means that suddenly materials upon which great industries depend, must be obtained from other sources. Importers, consumers and manufacturers are making anxious inquiries as to where they may find in the United States supplies of crude materials to replace the foreign supplies now shut off. This is the opportunity of the United States to free itself from dependence of its industries upon other countries, and business men are awakening to this fact. They look to the Government for aid in finding new sources of material with which to keep the factories open and in operation. When they have found the domestic supply and begin its use, they will not return to dependence upon the foreign supply, and thereafter good or bad times in the United States, so far as the maintenance of industries is concerned, will be more independent of foreign complications."

"What is the Government doing to aid industry in these matters?"

"All it can do under present laws," replied the Secretary. "The nation's greatest natural resources are a part of the public domain, and under the charge of the Interior Department. The annual reports on the mineral resources of the United States published by the United States Geological Survey for the last thirty years, contain not only statistics of yearly production of all commercial minerals, but also useful facts regarding the occurrence, exploitation and application in the arts and sciences of the mineral wealth of the country. The Geological Survey has been instructed to furnish upon request the addresses of producers from whom buyers can supply their wants if the mineral is produced at all in this country or information regarding the localities where reported deposits are undeveloped. In some instances large deposits remain undeveloped simply because of the fact that distance from market has given to the foreign sources of raw material with the lower ocean freights an advantage over domestic producers shipping by rail."

"What immediate effects upon mineral industries may be expected from the war?" Mr. Lane was asked.

"Already the copper industry has felt the injurious effect of war," he said, "and production has been curtailed. While considerable copper is consumed in the munitions of war, the constructive arts of peace furnish a far better world market for American copper than will the destructive art of war. In the case of zinc, however, the effect of the European war is the opposite. The smelting centers of the Continent are in the zone of fighting. In Belgium, for instance, practically all the zinc smelters lie along the line of attack chosen by the German armies, while in Rhenish Prussia, Austria-Hungary, and Russian Poland the smelters are likewise located where military operations promise to be most active. It is within the limits of probability to expect a loss of a half million tons in the foreign production of zinc or nearly half the world's output, with beneficial effect upon the recent overproduction in the United States, especially as affording the opportunity to export zinc and galvanized-iron products to South American countries, which market has hitherto been only in part utilized by our exporters.

"Fuel oil has a large use in naval warfare of today, yet the tying up of the big tank steamers on both the Atlantic and Pacific seaports is already embarrassing the oil producers of this country who depend so largely upon the export trade in all the forms of petroleum, crude and refined. On the other hand, Russia, our strongest rival in oil production, must suffer more complete and longer continued interruption of exports, which should tend to enlarge the market for our oil.

"The supply of cheap foreign barytes has prevented the development of many good deposits of that mineral, but with the consumers on the Atlantic seaboard already looking for domestic supplies, some of the southern mines should be reopened to supplement the outputs of those in operation at the present time.

"The closure of the European market leaves but one buyer for the radium ores of Colorado and Utah, which is decidedly to the disadvantage of the miner. Had the legislation introduced in Congress been promptly enacted the United States Government would probably have been buying these ores at this time.

"While the United States leads in coal mines," continued the Secretary, "the six European nations now at war happen to be the six next largest coal mining countries, producing together over half the world's coal. Interference with both the mining and the commerce of these nations must necessarily increase the demand for our coal at least in the neutral countries of the world. And coal is our one resource about which there need be no present anxiety. The United States is now producing 40 per cent of the world's supply of coal, and the reserves yet to be drawn upon exceed, so far as known, those of all the rest of the world combined.

"It is not generally known, however, to what an extent we have been depending upon Europe, principally Germany, for many of the chemical products derivable from coal, and which we have been permitting to go to waste, in the most reckless manner. Coal tar obtained in the manufacture of coal gas, and of coke (in retort ovens) is capable of producing hundreds of chemical products, but the chemical industries dependent upon coal tar as a raw material have had little development in the United States. Our imports of coal-tar products in 1913 were valued at $11,000,000 at initiating points and when they reached the ultimate consumer probably cost double that amount. If the present war continues any length of time, the American consumer will have to do without aniline colors and dyes, certain drugs, and numerous other coal-tar products, or the American manufacturers will undertake to supply these essential commodities which have hitherto carried the label 'Made in Germany.'"

"The Panama Canal is opened in time to help us in many ways. Bolivia, for instance, is one of the greatest tin-producing countries in the world, but its heaviest exportations have been to Europe, and the United States has been getting its supply of materials for the manufacture of tin plate and tin alloys from London and Liverpool. With the suspension of European industry and the opening of the Canal, there is no good reason why we should not now step in, bring Bolivia's tin ore to this country and manufacture it."

"Would this change of supply mean higher prices in this country?" Mr. Lane was asked.

"Not necessarily," replied Mr. Lane. "During the period of transition from one supply to another, and the initial development of new sources of material, cost of production might possibly be slightly enhanced, but with a new production and distribution system, wholly domestic, once established, there is no reason why prices should be higher, and no reason why fluctuations in prices in other countries should so affect our industries or prices of our products to home consumers."

## Electrical Papers Presented before American Institute of Mining Engineers.

The annual convention and 108th regular meeting of the American Institute of Mining Engineers was held in Salt Lake City, Utah, from August 10 to 14, inclusive. The program covered almost exclusively papers relating to problems in the metal-mining industry. Several papers dealing with the applications of electricity to the mining and ore-treating industries were read and discussed. These were as follows: "Electrical Fume Precipitation at Garfield," by W. H. Howard, Garfield, Utah; "Melting of Cathode Copper in the Electric Furnace," by Dorsey A. Lyon and Robert M. Keeney, Pittsburgh, Pa.; "Electrostatic Separation at Midvale," by H. A. Wentworth, Boston, Mass.

### Electrical Fume Precipitation.

The paper by Mr. Howard gave a detailed summary of the fume-precipitation plant installed at the Garfield Smelting Company's smelter, Garfield, Utah. It was found that a considerable amount of lead fume escaped from the stacks of the converter plant; it was though that, if this metal could be recovered at a reasonable expense, an attempt should be made to collect it. A study was first made of possible filtration through bags, but careful estimates showed that this would not prove a commercially satisfactory proposition. The Cottrell electric fume precipitation plant at Coram, Cal., was investigated and the results there achieved seemed to indicate that it would be a desirable one to use at the Garfield smelter.

The Cottrell process consists in general in the conversion of a high-tension alternating current of 30,000 to 60,000 volts into a direct intermittent current of the same potential, and the application of the latter current to certain electrodes suspended in a flue conveying the gases to be treated. These electrodes in their simplest form consist of narrow suspended metal plates spaced regularly 5 to 12 inches apart, depending upon the voltage used; between adjacent plates and parallel and equidistant from them is stretched a fine wire to every space, these wires forming the discharge electrodes and the plates the collecting electrodes. There is thus maintained through a silent or glow discharge an electrically charged field, through which the gases travel and all dust or condensed fume or moisture becoming electrified is deposited on the plates.

Some preliminary experimental work was then begun at the Garfield smelter along this line. The apparatus was installed to produce a direct intermittent current of 20,000 to 30,000 volts. At first the regular plates and pubescent electrodes were tried, but subsequently iron pipes of different diameters and lengths were used in place of the plates. Instead of the pubescent electrodes wires were placed axially so as to give a more uniform electrical treatment. Five-inch pipes 10 feet long and placed vertically give the best clearances when the velocity of the gases does not exceed 15 feet per second through the pipes. The first plant installed was designed for the treatment of 50,000 cubic feet of converter gas per minute. Alternating current at 2,300 volts was stepped up to 23,000 to 30,000 volts and then rectified by means of revolving rectifiers. The rectifiers were driven by three-phase 220-volt synchronous motors. It was found that practically all of the lead was precipitated from the smoke at a temperature of 340 degrees centigrade, but that the $SO_3$ and the $As_2O_3$ escaped. In order to precipitate the latter and obtain complete smoke clearance a temperature of about 90 degrees centigrade was found necessary. It was therefore suggested to try fractional precipitation by using treaters in series; thus the passing gases could be treated at different temperatures so as to permit classifying the elements of the smoke. As the result of excellent recoveries made in this first installation authority was obtained to erect an enlarged plant to treat all of the smoke from the converters. A small treater was also erected for experimental work on blast-furnace, roaster, and reverberatory-furnace gases.

A summary of the tests at the Garfield plant showed that the pipe electrode was preferable to the plate electrode; the pubescent electrode is better replaced by a single wire; it was proven that 95 per cent to practically complete clearance of the smelter gases can be obtained if the temperatures are maintained under 100 degrees centigrade; by treatment of the gases at different temperatures in treaters arranged in series with the necessary drop in temperature in treaters, fractional precipitation may be possible; thus the bulk of the lead may be collected in one treater and then by further cooling of the gases most of the arsenic, sulphuric acid, etc., in a second treater. Similar conclusions were reached at the Murray plant of the American Smelting and Refining Company. However, at both of these plants the treatment was on gases particularly favorable to this process, and the author states that it does not follow that all smelter smoke can be treated as successfully. An enlarged plant is now being installed at Garfield and will contain seven treating units to take care of a total output of 250,000 cubic feet of gas per minute at a velocity ranging from 9.6 to 12 feet per second. Electrical equipment includes seven complete motor-generator-rectifier sets and transformers, and switchboard panels to control them. Each set consists of a 30-horsepower, 250-volt, direct-current motor, direct connected to a 20-kilowatt, 60-cycle, 220-volt, single-phase generator; the alternating current is stepped up from 20,000 to 30,000 volts by means of a 20-kilowatt transformer and is then led back to the rectifier, which is on the same shaft with the motor-generator.

### Melting of Cathode Copper in Electric Furnace.

The paper on that subject, by Messrs. Lyon and Keeney, showed that the electric furnace has always been found to be especially adapted to melting, refining and finishing processes. If cathode copper were in a marketable shape it would be ready for immediate use, since it is practically pure copper, but in order to put it into convenient form for shipment the cathodes must be remelted. This is usually done in the reverberatory furnace. The authors show that this is really superfluous, and sometimes even harmful. The conditions necessary to make the electric furnace melt all cathode copper satisfactorily are pointed out. Where used, the electric furnace method has a number of advantages, among these being that the product can be made entirely free from oxygen. The authors state that of the various types of electric furnace, the indirect-arc furnace in which an arc is drawn between electrodes and in which the passage of the current is entirely independent of the molten bath is the one best adapted for the purpose.

### Electrostatic Separation.

The paper on the electrostatic separation by Mr. Wentworth gives a description and summary of the results obtained at the plant of the United State Smelting Company, Midvale, Utah. This employs the Huff electrostatic separation process and is operated in connection with a wet concentrator. The middling coming from the wet mill is passed through a dryer and then through a series of screens before entering the separators. The latter are installed usually in triples, one being above the other two; this makes a rough separation in the first machine of the minerals to be separated and the final cleanup in the separators below. Each unit produces three products, a finished "iron," a finished "zinc," and a middling product. The latter is returned to an elevator and again passed through the screens and separators.

The separators are electrically energized by a small self-contained electric unit, maintained in a dust-free room at one side of the mill. This unit consists of a three-horsepower motor belted to a single generator and exciter. The potential is raised by a transformer to 18,000 to 22,000 volts. One terminal is grounded directly to the metal part of the machine. The other terminal runs well insulated through the mill and is connected to the attracting electrodes of the separators, of which there is one to each roll or separating element.

## Committee Report on Unified Electricity Supply for London.

In the ELECTRICAL REVIEW AND WESTERN ELECTRICIAN of May 9, 1914, was given a summary of the engineering report by Messrs. Merz and McLellan on the proposed systematized and unified supply of electricity to the city of London, England. The Special Committee of the London County Council, appointed to draw up a scheme for placing all electrical supply of the greater city under central control has now reported a plan, which probably will not be put into early effect because of present war conditions.

The report contains many interesting features, however, and doubtless will serve as the basis for future consideration of the unification scheme. The committee's plan follows out the technical ideas of the Merz and McLellan report, but deals chiefly with the manner in which the project is to be financed and executed.

One of the favorite arguments of municipal ownership advocates in this country, says the *Wall Street Journal*, has always been to cite the advantages which they say are secured under municipal ownership, control and operation of public utilities in Great Britain, but the scheme now proposed in London abandons the policy of municipal operation entirely and adopts a plan something like that under which the New York subways were built and are operated.

While in many English cities municipal undertakings have given efficient service to the public this efficient service has been at the cost of an increase in general taxation and the Special Committee in its scheme plans to avoid this and make the consumer of the product, and not the general tax-paying public, bear the entire cost of capital, generation and distribution. To this end it is suggested that the present 39 municipal undertakings and the 31 private companies generating and distributing electric current in Greater London be taken over by the municipal authority, which shall exercise powers similar to a trusteeship, but the actual operation of the undertaking is to be intrusted to a corporation which will be administered by technical experts and by those who understand the financing, the generation and the distribution of electricity. Of the capital to be raised to acquire present plants and to provide for future extensions and improvements of the system two-thirds is to be raised by the city and one-third by the corporation.

Maximum rates are to be fixed in the charter of the company with these rates subject to revision from time to time upon application of the city or the company and accounts of the company to be audited annually by auditors appointed by the city and the company. Payments for existing plants are to be made in stock and shares of the company. A contract for a definite period is to be entered into between the city and the company and a sinking fund established to write off in 60 years the land and engineering works, in 40 years the transmission and distribution lines, in 25 years the power stations, substations and all equipment therein, in 12 years all service lines, in 30 years all interest paid out of capital and in 30 years the purchase price of all existing undertakings.

After a special reserve fund has been established there is to be provided for the payment of interest at four-per-cent on the capital furnished by the city and at four-per-cent on that capital furnished by the company, a sinking fund of two-per-cent a year on the whole of the capital, and the formation of a reserve fund of one-half of one-per-cent a year on the entire capital. The surplus profits over and above the deductions for sinking funds, interest, and reserves are to be divided equally between the city and the company until the company receives a share sufficient to pay a further four-per-cent on its capital investment, making in all a return of eight-per-cent to the company. Any further profits would, as regards seventy-five-per-cent be utilized to give a rebate on the prices charged to consumers and the remaining twenty-five-per-cent would be divided equally between the city and the company. The city is to have power to utilize its profits received from operation as it may determine. In making its report the committee had the following to say on the provisions of the new plan:

"It represents a combination of private and municipal enterprise designed to ensure full control by, and an adequate share of profits to, the public, with the flexibility and commercial enterprise due to corporate management. The best features of both systems of working will thus, it is hoped, be secured. Moreover, under the arrangement contemplated it is hoped that the services will be secured in the working of the new undertaking of those who have had wide experience in the electrical industry and the peculiar conditions existing in the area to be dealt with.

"The scheme involves the co-operation of the authorities in outer London with the London County Council and in view of the importance of the outside area to a thoroughly satisfactory scheme of supply we regard this as an important point. No compulsory purchase of existing undertakings will be entailed, and interference with existing undertakings will be reduced to a minimum."

## Exhibit of the Bureau of Mines at the Panama-Pacific Exposition.

The United States Bureau of Mines is planning a comprehensive exhibit at the Panama-Pacific Exposition, San Francisco, next year. In arranging the exhibit, the Bureau has had in mind, not only the value of interesting those engaged in the various mining and metallurgical industries, but also the education of the general public to a better knowledge of the magnitude of these industries and to the efforts which are honestly being made by the miners and mine operators, with the assistance of the Bureau of Mines, looking toward a more safe conduct of mining and a more efficient utilization of the products of the mines after they are won from the earth.

The Bureau's exhibit is located in the Palace of Mines and Metallurgy. An automatic duplex projecting machine will continuously show lantern slides illustrative of the activities of the Bureau and simultaneously give descriptions of the lantern slides.

Nearby will be shown the layout of a model hospital, including a receiving room, ward room and operating room, fully equipped for demonstrations by the United States Marine Hospital Service; also a model of a change and wash house, another welfare feature which is being installed at modern mining and metallurgical operations. A plan of an ideal mining town will be shown.

First-aid demonstrations will be given frequently. An air of reality will be lent to the demonstration by the removal of apparently injured men from the exhibition mine beneath the building by helmet and rescue crews.

A complete display of rescue apparatus and safety lamps will be given in a glass smoke-room Tests of safety lamps will be made, showing their tendency, under unfavorable conditions.

to ignite explosive gas, and also showing methods of testing for explosive gas by means of their caps. An exhibit of the physical and chemical characteristics and constituents of explosives is being arranged.

Visitors going through the exhibition mine will regain the surface through the radium booth in which actual radium emanations will be shown. Surrounding this radium booth, there will be complete exhibits of the various radium ores and of radium products. The metallurgy of various products will be shown by a comprehensive exhibit.

The opportunity for increased efficiency in the use of fuels will be demonstrated by a device showing the proportionate amounts of fuels which go to make up the various losses incident to consumption in comparison with that which ultimately goes to useful purposes. Typical analyses of coal from the various fields will be shown by models and samples, as will also the yield of coke and by-products obtained by various coking processes. It is expected to show smoke-preventing and smoke-producing methods of stoking by means of an ingenious motion-picture device.

An officer of the Bureau will give his whole attention to visitors. Copies of the Bureau's publications will be available for free distribution to visitors who may be interested.

This exhibit, in connection with the exhibition mine immediately beneath the Bureau's space, should be interesting and instructive to those engaged in the mining industry and to the general public.

## Direct Utilization of Solar Radiation.

The proposal to use the direct rays of the sun in the development of power has been frequently made and in a number of cases has been tried out with more or less success on an experimental or trial basis. A recent installation in Egypt is reported to have been giving excellent results. It consists of a water-tube boiler upon which the solar radiation is reflected by five semi-cylindrical mirrors, each of which has a length of nearly 200 feet. These mirrors are about 20 feet apart and so arranged that they automatically are turned by means of an electric motor so that the solar rays are always reflected upon the boiler. This is done by means of an ingenious electrical control system involving thermocouples. The installation is said to evaporate 1,430 pounds of water per hour. The steam is utilized in a steam-driven electric generating set. The plant develops 250 horsepower for a radiating surface of 4,780 square yards.

## Connecting and Similar Errors in Three-Phase Meters.

Meter errors can be divided into two classes—those which are due to defects in construction or adjustment of the instrument as such and those which are attributable to incorrect or faulty connections. Faults in the meter itself usually cause only comparatively small errors, and the latter are detected and corrected during the normal standardizing tests on the instrument. Indirect or faulty connections may, however, cause a very large

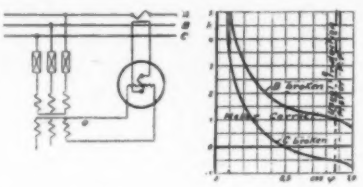


Fig. 1. Fig. 2.

error and one which may (and frequently does) escape notice for months or even years. Errors of connection can hardly occur in direct-current or single-phase meter circuits, owing to the simplicity of the latter, but such errors may easily be committed in three-phase circuits, according to article in *Electricity*, translated from the *Electrotechnische Zeitschrift*.

In order to make clear the succeeding paragraph, it is necessary to recall the fact that in rotating field (Ferraris type) three-phase meters—which are most generally employed—current and pressure windings combine their actions to produce a rotating field which sets a disc armature (usually of aluminum) in rotation. The disc runs between the poles of one or more iron cores, on which are wound the current and pressure coils, and

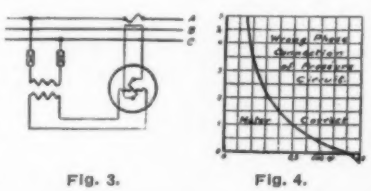


Fig. 3. Fig. 4.

braking is provided by a permanent magnet. Owing to the short air gap, a comparatively powerful torque is exerted on the armature disc and the meter is practically unaffected by external fields. The simplicity and strength of the whole construction is responsible for the extensive popularity which this type of meter has attained. It is easy to show that, for accurate meter readings, the fields due to the current and pressure coils must be 90° out of phase with each other; exactly this displacement is produced by the use of an inductive ballast coil, a magnetic shunt or a short-circuit winding. A single-phase meter element of this type may be used to measure energy in a balanced three-phase circuit, its reading being multiplied by three (this multiplication may be effected once for all in its calibration; or two single-phase elements combined in one case may be used on the two-watt-meter principle to measure energy in unbalanced circuits. In high-tension circuits, meter transformers would be employed as in Fig. 1, and, the transformers being of small capacity, the fuses would necessarily be long, thin and easily broken (mechanically or by electrical surges, etc.). If the *B*-phase fuse were broken, the phase voltages *BC* and *AB* would be inoperative on the meter; the three-phase transformer would be in effect a single-phase transformer, and it can easily be shown that:—

Actual meter reading
$= (0.75 + \frac{1}{4} \times \sqrt{3} \tan \Phi) \times$ true reading
$= k \times$ true reading.

and the percentage error in the meter record $= (k - 1) \times 100$ per cent. Values of $k$ corresponding to various values of the power-factor $\cos \Phi$ are shown in Fig. 2, from which it will be seen that the meter reads correctly on 0.87 power-factor ($k = 1$), but runs 25 per cent slow on unity power-factor and 50 per cent fast on 0.5 power-factor. If the meter were supplying an induction motor load at the time of inspection, the broken fuse might escape attention and very serious errors would then arise when the power-factor of the load changed.

If the phase-*C* fuse (and not the *B* fuse) were broken, the values of $k$ at various power factors would be as shown by curve *C*, Fig. 2. The meter would run backwards when supplying loads of power-factors exceeding 0.5, and it is quite likely that, if this were noticed at the time of installing the meter, correct direction of rotation would be obtained by reversing terminal connections, thus leaving the true trouble undiscovered. Finally if fuse *A* were broken, the meter would remain stationary under all loads, and the fault could not long escape detection.

Another method of measuring three-phase energy by a single-phase meter is shown in Fig. 3; instead of producing 90° phase difference in the meter itself, the natural phase difference (60°) of the network itself is employed. Only a simple resistance is required in series with the pressure coil and a single-phase measuring transformer can be used to supply the latter. A break in the transformer fuses stops the meter and hence is easily detected, but it is easy to connect the transformer across phases *A*, *B* (instead of *A*, *C*), and thus to introduce serious error. In this case:—

Actual meter reading

$$= \left( \frac{\sqrt{3}}{2} \tan \Phi - \frac{1}{2} \right) = \text{true reading}$$

$= k \times$ true reading,

and values of $k$ for various power-factors

are shown in Fig. 4. Below 0.5 power-factor, the meter runs too quickly, and above this limit too slowly. At 0.87 power-factor, the meter stops, and at yet higher power-factor it reverses. The rule frequently observed in connecting the meter is to place the pressure connections across the phases yielding fastest running, but this *only applies when the power-factor exceeds* 0.5. If a number of motors are running light when the meter is installed, the power-factor may easily be less than 0.5, so that the above mistake in connections is very liable to occur and very carefully to be guarded against. In meters with two current circuits, care is required to secure correct connection of these as well as of the pressure circuit.

Where two meter systems are used to measure energy in an unbalanced three-

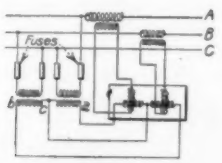



Fig. 5.

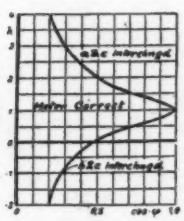



Fig. 6.

phase system, the correct connections are those in Fig. 5. Often the meter transformers are located at some distance from the meters, the connecting leads being carried thence with others in a conduit. It is easy for this or other reasons to interchange two leads in the pressure-coil connections, and the effect of this mistake on the meter record is shown by Fig. 6 (assuming balanced loads). The value of the factor $k$ is given by:—

$$k = 1 - \frac{\tan \Phi}{\sqrt{3}}$$

if connections $b$, $c$ are interchanged

$$\text{or } k = 1 + \frac{\tan \Phi}{\sqrt{3}}$$

if connections $a$, $c$ are interchanged.

If the load be unbalanced, the error produced depends on the distrbution of current between the phases, hence no general statement of error is then possible. Apart from interchange of the middle phase with one of the outer phase connections, it is possible that the one phase circuit be broken by defective contact or broken fuse, etc. Only one half of the meter is then operative, and if this be the half which should meter a load of less than 0.5 power-factor, the net reading will actually be increased by the defect, which may thus escape detection for some time.

In cases where the ultimate demand will not be supplied for months or years to come, small meters should at first be installed, otherwise 10 per cent or greater error may easily arise in meter records due to inherent errors of the instrument at very small fractional loads. Most meters will carry 25-per-cent overload safely for one hour and 50-per-cent or 100-per-cent momentarily.

The first step in eliminating such errors as those discussed above is to reject entirely all rule-of-thumb methods; these generally depend on conditions, the existence of which it is not easy to determine. Rotating field indicators are a valuable assistance in checking connections. Connections should be arranged so that each lead can be followed easily for its whole length; in some cases, multicore cables with distinctively colored cores are convenient.

In important circuits, each meter should have its own transformer, and the latter should not be fused too lightly; it is only necessary to protect against short circuits, and for this purpose comparatively heavy fuses are suitable. Two completely independent meter systems should be installed in each important circuit, and to check their readings an independent wattmeter (*not* ammeter) should be provided. From time to time tests should be made with a standard meter and independent meter transformer, with a view to detecting broken or defective connections. Only by these means can accurate metering in three-phase circuits be ensured.

## Heavy Assessment on Bonus Stockholders of Bankrupt Utility Company.

Holders of bonus stock of the Hamilton Gas & Electric Company, of Hamilton, O., which was issued in 1907, were much disappointed at the recent decision of the Federal District Court in Cincinnati sustaining the ruling of the referee in bankruptcy that such stock is subject to an assessment of 100 per cent. The court modifies this ruling to the extent of holding the assessment to be for the benefit only of those creditors whose claims are founded on transactions which occurred after the stock was issued, save those who are themselves holders of the stock or who had knowledge of its issue. The referee will ascertain just what creditors are entitled to share in the proceeds of the assessment under this decision and report to the court.

## Lightning Damages Power Station.

The Bangs power station of the Central Maine Power Company, at Waterville, Maine, was damaged by lighting, August 12, to the value of about $30,000.

## City License Tax on Meters Declared Unconstitutional.

By a decision of the State Supreme Court in an opinion handed down last week the ordinance passed by the City Council of Salt Lake City, Utah, four years ago levying an annual license tax of $1.00 against each meter in use by the Utah Light & Railway Company is held to be invalid on the ground that it is not uniform in its application.

The right of the city to pass an ordinance requiring such a license fee is upheld by the court and it is announced that the matter of passing an amended ordinance to meet the requirements of the Supreme Court's decision will be laid before the City Commission in the immediate future. Under the present ordinance, which is declared invalid, the Utah Light & Railway Company was compelled to pay to the city from $25,000 to $30,000 annually in meter assessments.

The Supreme Court says that a company selling by flat rate would be exempt from the license tax under the present ordinance and for that reason it is class legislation in violation of the fourteenth amendment of the Federal Constitution.

The ordinance was passed by the city four years ago and the company declined to comply with it. The city began a prosecution against the company for alleged violation of the ordinance. The company was convicted in the city court and appealed to the Third District Court where the ordinance was upheld by Judge Frederick C. Loofbourow. The Supreme Court now reverses the judgment of Judge Loofbourow.

The company contended before the Supreme Court that the city had not the right to impose an "additional burden" contending that under the franchise granted to the company by the city such an "additional burden" is provided against. The Supreme Court rules against this contention, holding that the right to levy the tax is inherent with the city and cannot be bartered away in any franchise or agreement. Thus, the Supreme Court says that the principal of the tax is valid but the particular ordinance in question is not.

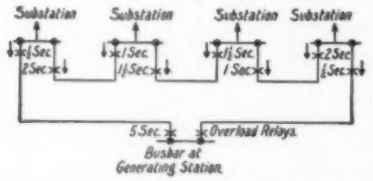
Inference is made that an ordinance could be so drafted as to be valid in the premises. It should, however, include the present companies in operation in the city and also those which may operate there in the future, whether they sell electricity by meter or flat rate,it is held.

After the opinion had been handed down announcement was made by the city law department that another ordinance will be drafted.

# New Electrical and Mechanical Appliances

## Reverse-Power Relays for Protection of Ring-Type Systems.

The new reverse-power relays manufactured by the Westinghouse Electric & Manufacturing Company can be furnished with definite-time-element characteristics by means of Westinghouse torque compensators, and thus can be used for protecting certain ring-connected distributing systems where differential relays with expensive pilot-wire connections would be otherwise required. The diagram herewith shows a typical system of this kind. The relays can trip only when overload flows in the direction shown by the arrows. Each relay is set for the definite minimum time indicated. If a ground occurs on either feeder or connecting line, power flows to that point from both ends. It will be seen that relays nearest the fault, on each side, trip first, thereby cutting out the defective line and not interrupting the supply of power to the substations.




Arrangement of Reverse-Power Relays for Protecting Ring System.

In case of a heavy "short" near the substation, the voltage may drop very low, but these relays are so sensitive that they will operate correctly even if the voltage drops to two per cent of normal.

## Arc Lamp as an Incubator.

The adaptability of the immigrant has never been more clearly exemplified than in the case of the English sparrow who, apparently under the most adverse circumstances, makes himself thoroughly at home and does not hesitate to poach on his neighbors, be they human or bird, when his wants demand service.

The accompanying illustration shows how these birds have utilized the most modern form of street arc lighting for artificial aid to their natural means of incubation. The picture shows hanging in the streets of a prominent American city, a Westinghouse metallic-flame arc lamp into the top of which the sparrows have stuffed a mass of material for a nest.

This electric incubator, if it may be so called, has successfully produced three hatchings of sparrows, who, apparently are not at all disturbed by the intense volume of light given off by the lamp or the heat generated at the top where the ventilating orifices are located. They seem to be willing to put up with a little discomfort in order to permit the mother bird to attend the social duties and outings of her kind, of which she would at certain periods otherwise be deprived.

Nest on Arc Lamp.

It must have been a kind-hearted lamp attendant that would permit this accumulation to remain after one hatching, but it has been found that even where the nests are torn out and the material scattered away from the lamp selected by the colony, it is replaced in a surprisingly short space of time.

A lamp of this type burns from 250 to 300 hours without a renewal of the electrodes, or consequent inspection by the attendant, with the result that at this period of the year an interval of from four to six weeks may elapse between his visits, thus affording ample time for incubation purposes.

An automatic telephone exchange with a capacity of 10,000 lines is being installed at Medicine Hat, Alberta.

## A New Ventilator for Telephone Booths.

To insure greater comfort while telephoning, a new telephone-booth ventilator has recently been put on the market. It is generally the case that where there is no ventilating set the booth is hot, stuffy and uncomfortable. When one shuts the door of the telephone booth to obtain privacy, one also shuts out the supply of fresh air.

During the past few years telephone companies have found a ventilator to be a real commercial asset. Comfortable booths in which there is a constant circulation of fresh air prove an incentive for longer talks over toll lines as well as for additional local calls. The increased revenue made possible in this way prompts the prediction that the near future will see all telephone booths with ventilators.

Telephone-Booth Ventilator.

The Western Electric-Sturtevant telephone-booth ventilating set shown herewith is the outcome of several years of experimenting to develop a ventilator that will not interfere with conversations nor destroy the sound-proof quality of the telephone booth. The set consists of a quiet-running motor-driven multivane fan, an extended outlet fitted with a diffuser, slides for exhaust air and felt pads for insulation purposes. To install the set it is only necessary to cut a round hole

in the top of the booth and two slots for outlet gates.

The fresh air is supplied quietly and without any draught. The foul air escapes through the vents that are specially devised to prevent any sound from being heard outside. By flooding the booth with cool, fresh air the set gives comfort to the occupant even on the warmest days.

## An Electric Dishwasher.

One of the most disagreeable features connected with household duties is the task of washing a big batch of dishes several times a day. This has been found irksome, not only by the housewife, but has been one of the chief reasons why it is so difficult to get servants to stay for any length of time. Efforts have been made to solve the problem of washing dishes by means of machines and some of these, mechanically operated, have come into use. They require considerable muscular effort for their operation, however, and while they simplify the task are by no means a complete solution of the difficulty.

Fig. 1—Geyser Electric Dishwasher.

What seems like an ideal method of treating dishes after use has been brought forth in the new Geyser electric dishwasher that has been placed on the market by the Electric Dishwasher Company, Incorporated, 42 Pearl Street, Buffalo, N. Y. A good idea of the general appearance of the household size of this appliance is shown in Fig. 1, which is a view of one of the portable washers. This outfit is mounted on a framework with castors to permit its ready removal from one place to another in the kitchen. Similar outfits are made without castors and intended for direct connection from the discharge pipe to the house drains; in this case, a connection is also furnished from the hot-water faucet.

The principle of the machine is that the dishes are placed in a specially constructed wire rack in which they are easily set; this rack is circular in shape and fits around the central cylinder inside of the washing chamber. From the top of the cylinder is suspended a circular wire basket in which glasses and silverware are placed. Beneath the tank is a centrifugal pump driven at high speed by an electric motor; this circulates the six to eight quarts of hot, soapy water necessary for the operation at a rate of about 30 gallons per minute under six pounds pressure. The manner in which the hot water can splash among the dishes is shown in Fig. 2, in which part of the tank is represented as broken away. These forcible streams of water continually fill all parts of the tank and reach every portion of the dishes contained therein, so as to insure a thorough cleansing. Less than a minute is required for operating the pump and washing the dishes. The drain is then opened and the water drawn off. Fresh hot rinsing water is then poured in and the dishes are rinsed for a few seconds by a second operation. Since the articles cleansed are above the water and placed vertical to provide for draining the water, the latter runs off within another minute into the lower portion of the tank. The combined heat of the dishes and the tank, together with the heat of the rinsing water in its bottom, quickly dries the entire batch of dishes, so as to obviate the necessity for drying each individual piece.

Fig. 2—Internal Arrangement of Washing Chamber.

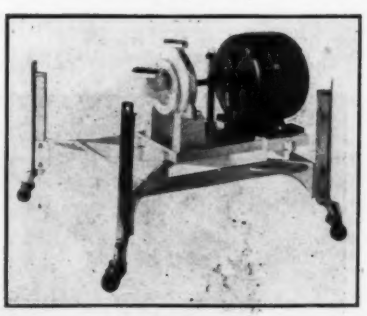


Fig. 3—Motor and Pump Below Tank.

This entire process not only is a great time and labor saver but insures the most sanitary cleansing of dishes. The practice of using more or less soiled and frequently contaminated dish cloths is entirely done away with. The clean dishes are not touched by any towels or other cloths and are entirely free from lint, etc. The entire operation of washing, rinsing and drying can be finished in three minutes and throughout this operation the hands need never touch the water.

Fig. 4—Inserting Main Dish Rack.

The tank of the dishwasher is made of 20-ounce copper, which is heavily nickel-plated. The central cylinder and all the fittings as well as the pump are made of brass. All external fittings are nickel-plated. The appearance of the lower portion of the machine when the tank has been removed is shown in Fig. 3, which gives a good idea of the arrangement of the motor and pump. The lower portion

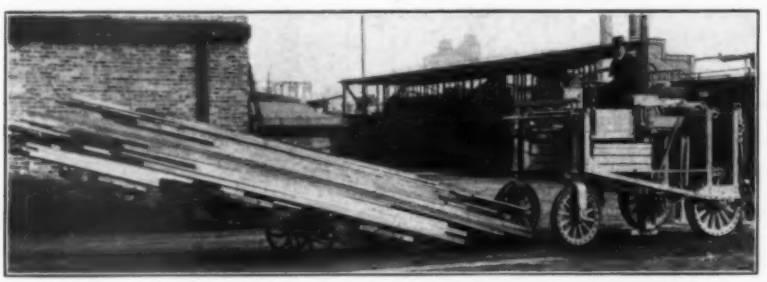
of the tank is of such depth that the soiled water can collect in this portion after the washing has been completed and while the dishes are draining without touching any portion of the dishes themselves. The diameter of the machine is 23 inches and its height from the floor is 32 inches, exclusive of the cover. Larger machines are made for restaurants, clubs, hotels, etc.

## An Electric Lumber-Carrier.

The lumber-carrier shown herewith was designed primarily to handle lumber in and around saw-mill plants. This work is ordinarily done with the horse or mule hauling a two-wheeled truck, on which the lumber is piled. The new machine has been found to be a decided saver of labor, time and money, since it accomplishes the work of several teams and men.

In using this electric carrier, the lumber may be piled on two-wheel trucks, in the ordinary way, and the truck is then picked up by the carrier, or the lumber may be piled in units of 2,500 to 3,500 feet upon two cross pieces, or bolsters, which are picked up by the four hooks provided on the carrier for that purpose. When the load is ready,

Lumber-Carrier Hauling Load.



Electric Lumber-Carrier Ready to Pick Up Load.

the carrier is driven over the lumber, either forward or backwards, and the driver throws the hooks underneath the ends of the bolster or under the side of the lumber truck, by means of a lever at his right hand, and the load is hoisted by power. The operator does not leave his seat either in loading or unloading, and requires no helper.

The power for both the hoist and for propelling the vehicle is furnished from storage batteries by a standard Westinghouse 80-volt vehicle motor, of about five horsepower normal rating, but good for 25 horsepower in sudden emergencies. The power is taken from the motor by means of a link-belt silent chain to a double clutch of the split-ring type, operated by an ordinary automobile gear-shifting device, one point connecting to the motor of the vehicle, and the other to the hoist. The controller, which is directly beneath the driver's seat, has six speeds forward and four reverse, and the machine is geared to 8 miles per hour with the ordinary load.

To provide against the racking of the frame on rough roads, the forward end of the frame hangs on a pivot connected to an equalizer which distributes the load on a heavy coiled spring within the shank of the steering forks. The frame is constructed of steel channels and angle irons strongly riveted together. The wheel base is 8 feet, with 34-inch front, and 42-inch rear wheels. Solid rubber tires are provided on the wheels.

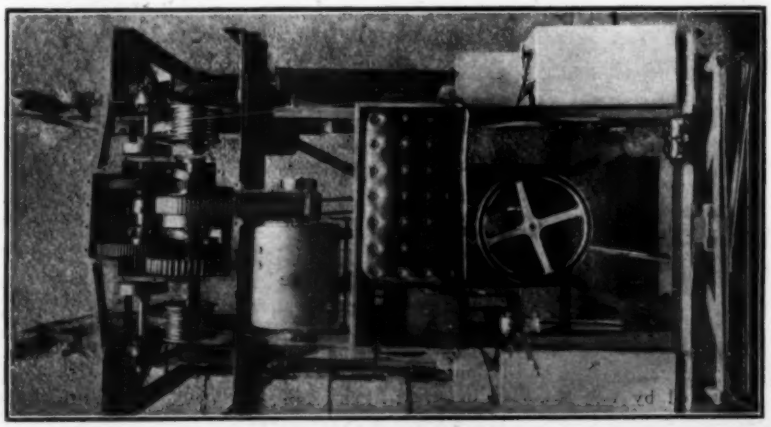
The storage battery is of the Ironclad-Exide type, consisting of 42 cells, with 15 plates each. The battery is mounted in two parts in the boxes seen at each side of the machine. Charging of the battery is done from a 110-volt direct-current circuit.

The carrier is arranged to turn on a very short radius, and can go almost anywhere a horse will go through with a load of lumber. In actual use, it will average about 5.5 miles per hour, including the stops for unloading and loading.

This machine was designed and built by H. B. Ross, of the Stetson-Ross Machine Works, Seattle, Wash., and Archie Chandler, 401 Railway Exchange Building, Seattle, has the selling agency.

## Electric Recording Time Clocks for Panama Canal Shops.

New recording time clocks are being placed in service in the machine shop, forge, pipe, tin, and copper shop, boiler and shipfitter shop, paint shop, car shop, planing mill, office, and round-house at the Balboa shops, Canal Zone. Fifteen clocks will be installed, two in each of the above-named build-



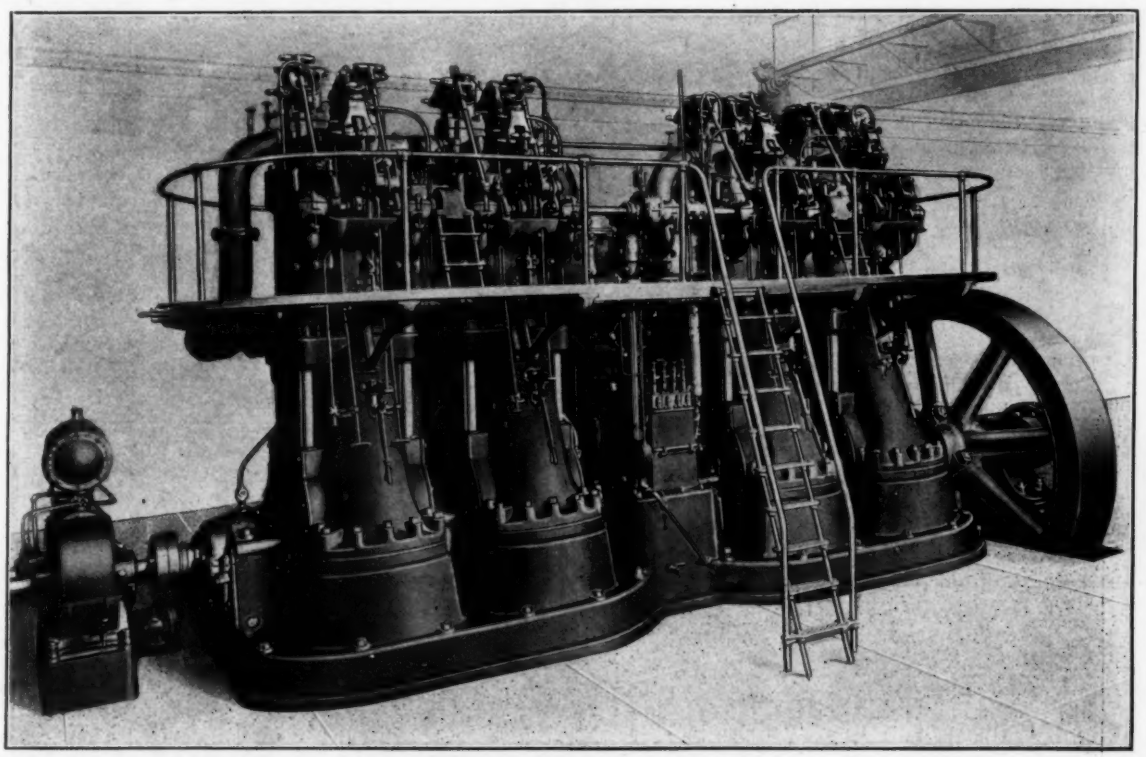
Top View of Carrier.

ings, except the paint shop, roundhouse, and office, in which one clock will suffice. All are electrically synchronized by a master clock in the office of the superintendent of the mechanical division.

The times at which employees check in and out are recorded by the clocks on ruled cards, one to each employee. At the top of the card are written the employee's name, shop roll number, designation, and rate of pay. Below are spaces for 15 days in the first half of the month, and on the back of the card are 16 spaces for the second half. Each of the day spaces is divided, horizontally, into spaces for the first and second periods of the day (or night) and for overtime. Each of these spaces is subdivided for checking in and out. The cards fit closely in a slot in the base of the clock, and guides and stops in the interior are automatically adjusted with the passage of each day and period to make the recording numerals strike the proper space on the card.

The cards are filed, in the order of roll numbers, in a rack beside the clock. Each employee, on coming to work, takes his card from the rack, inserts it in a slot in the clock, and presses a lever. This causes the recording numerals to register on the card through an inked ribbon, an act indicated by the sounding of a small bell. The employee then withdraws the card and places it in a rack on the other side of the clock. When he checks out, a similar operation takes place, the stamped card being then replaced in the first rack, ready for use at the checking in for the next period. The clock records on the basis of a 24-hour day, in tenths of an hour. Calculation of time worked and pay due is thus done entirely by the decimal system.

The printing ribbon is in two colors and shifts automatically at the beginning and end of each period. In other than regular working hours the clock stamps in red; during the regular working hours, in blue. Thus, if an employee is late in reporting, or checks out before the close of the period, the red numerals draw the timekeeper's attention to the fact.



600-Horsepower Diesel Crude-Oil Engine.

## Largest Diesel Engine Built in America.

The Lyons Atlas Company, of Indianapolis, Ind., has recently completed and shipped the largest Diesel engine constructed to date in this country. This engine is composed of four cylinders, 21 inches bore by 30 inches stroke, and is of the vertical, four-cycle type, rated at 600 brake horsepower with an overload capacity of 15 per cent, or 690 brake horsepower maximum. It was sold to the Hawaiian Commercial & Sugar Company through its New York agents, Alexander & Baldwin, Limited, of 82 Wall Street, and is intended to supersede one of the steam plants for irrigation purposes, to be direct-connected to a two-stage turbine pump of 15,000,000 gallons capacity at 200 feet head.

The conditions covering the acceptance of the engine were severe. The purchaser insisted that the engine should operate continuously 710 hours out of each 720 hours per month at rated load, using the ordinary 14 to 18 degree asphaltum-base California fuel oil, similar to that used in the purchaser's steam plant, and which is the only grade available on the Hawaiian Islands.

The test was conducted by the chief engineer of the Hawaiian Commercial & Sugar Company, and the engine was given a preliminary, continuous run of 48 hours with eastern paraffin-base fuel, after which all parts connected with the conbustion chambers were inspected in order to determine a basis for comparison between the effect of the two fuels. It was then subjected to a 144-hour continuous run at full load with fuel shipped by the purchaser from California to the manufacturer's works. At the completion of this run the combustion chambers were again examined, and as there was no evidence of deposit on the heads, valves, or pistons, the engine was accepted and is now en route to the Islands, to be erected by the Hawaiian company's engineers.

## The Wallace Portable Lamp.

A new type of handy portable lamp of very compact design and including several novel and valuable features has been placed on the market by the Wallace Novelty Company, 299 Madison Avenue, New York City. A general idea of the compactness and construction of this lamp is obtained from Fig. 1. The lamp is designed for use in a variety of ways and in any place where the light from a regular fixture does not reach the zone which it is desired to illuminate. Thus it can be used in the home, store, shop, garage, etc. Some of the uses for the lamp are shown in Figs. 2 and 4, the former showing the outfit clamped to the back of a chair so as to furnish light, properly shaded, for reading, without requiring any of the ceiling or other fixtures in the room to be lighted. The lamp can also be used as a piano or desk lamp or attached to the bedpost to permit the luxury of reading in bed. It can be secured to the edge or even directly to the reflecting surface of a mirror, so as to serve for giving the proper light for shaving, as shown in Fig. 4, or on a dresser or in a millinery shop or other place where the fixtures do not properly light up the face. Many other uses suggest themselves.

The manner in which this varied utility of the lamp is attained is made clear from Fig. 3, which shows the underside of the base. A disappearing hook *2* is included within the base that permits hanging the lamp on any hook or other object. An automatic clamp *3* is also included by means of which the lamp base may be fastened to a desk, the top of a chair, the rods of a bed, the edge of a mirror, table, sewing machine, etc. This clamp is covered with rubber tubing, so that it does not mar highly polished surfaces. Probably the most unique feature of the base, however, is the rubber suction cup *4*, by means of which the lamp can be secured to the surface of a mirror, window pane, or any other nonporous and smooth surface. To attach the lamp by means of the cup the inner surface of the rubber cup is first moistened, the base of the lamp is held against the mirror or other surface and the plunger which protrudes from the base of the lamp along the neck is firmly pressed toward the surface to which the lamp is to stick. If the lamp is attached in this manner there is sufficient suction to hold the outfit securely, thus providing a great convenience in a very simple manner.

Fig. 1—Wallace Portable Lamp.

The cord by means of which the lamp is connected to any fixture or other outlet is 12 feet in length and winds into the base of the lamp. This helps make the outfit compact, protects the cord when not in use and prevents having surplus cord dangling around the outfit; it is necessary to unwind only just sufficient cord to reach the outlet desired. The socket of the lamp is mounted on a joint so that the lamp can be adjusted to any desired angle or revolved in any direction to permit throwing the light just where it is desired. The adjustable shade *1* is readily removable and acts both to screen the direct rays of light from the eye and also to reflect the light in useful directions.

The outfit is durably constructed and finished in either satin-finished brass or highly polished nickel. The lamp with bulb and shade stands 12 inches high. Its weight is about one pound, thus permitting it to be easily carried in a hand grip. This feature has been found to meet the desires of traveling men who frequently are required to stop at hostelries but poorly equipped with convenient lighting fixtures.

Fig. 2—Clamped to Chair as Reading Lamp.

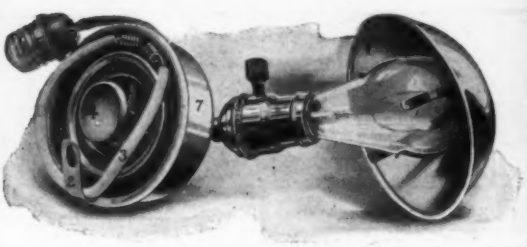


Fig. 3—View Showing Construction.

Fig. 4—Lamp Secured to Edge of Mirror.

## Bryan-Marsh Sales Conference.

An enthusiastic outdoor conference of Bryan-Marsh representatives from all parts of the country was held at Camp Nela, Nela Park, Cleveland, O., August 9 to 15. In point of work actually accomplished and enjoyment of those present, this gathering eclipsed any previous meeting of the kind held by this company. The delegates to this conference, numbering 22, were quartered in tents, and all meetings were either held in the open or under canvas.

Papers dealing with topics pertinent to lamp men were presented on Monday, among these being the following: "Characteristics of Type C Lamps and Series Circuits," by E. J. Edwards; "Type C Units and Competitive Illuminants," by Ward Harrison; "Miniature Lamps," by Paul Bauder; "Street Lighting," by A. M. Klingman; "Series Fixtures and Their Use," by L. G. Hewins; "Standardizing Series Materials," by Henry D'Olier.

A number of exhibits were arranged in tents under the auspices of the various departments of the National Lamp Works.

The representatives attending the conference were divided into groups, each under a captain, in order to facilitate inspection of the exhibits and discussions thereof. The various groups alternated in inspecting the exhibits, two entire days being taken for this purpose.

Exhibit "A" was arranged to show

the proper lamp for the circuit, equipment being demonstrated to show the effect on lamp sales of under and overvoltage burning. There was also exhibited a switchboard showing Mazda characteristics and results of proper voltage survey. Exhibit "B" was under the auspices of the engineering department and was arranged to show the application and operation of Type C lamps. There was also an illustration of research work and calibration of standard lamps. Exhibit "C," under the direction of the publicity department, outlined the various advertising campaigns and advertising service for agents, as well as special campaigns for central stations and lamp agents, and window displays for lamp merchants. The research laboratory had charge of exhibit "D," which was arranged to demonstrate the science back of lighting problems and specific instances of what can be done by altering the quality of light. Exhibit "E" dealt with Ivanhoe metal and exhibit "F" with commercial development of Type C multiple and series units. Exhibit "G" showed the complete line of the Holophane Works, and exhibit "H" was devoted to miniature lamps.

Discussion of all these exhibits was entered into by the visiting groups, and much of interest pertaining to the engineering and commercial development of lamps and lighting equipment brought out.

Numerous social and athletic events were arranged for during the week, and all the facilities of a modern summer resort were at hand.

## Graphic Meters.

The field of the graphic meter is continually expanding. Every day reveals new uses. In all these uses, the purpose of the records divides the accuracy requirements of graphic meters naturally into two classes. For some purposes accuracy is the prime requisite, and extreme accuracy can be maintained only by a rather expensive meter. There are many purposes, however, where simplicity of parts and ease of manipulation are more important than extreme accuracy, and meters designed on this basis may be considerably lower in cost.

One of the most important records for a central station operating series arc lamps is a graphic chart showing the actual time the arc lamps are in operation each night and the actual current supplied to the lamps. A simple graphic ammeter of this character used to take weekly records settles at once, and with slight expense, many disputes with municipal authorities regarding hours of burning.

A graphic meter on the service end of each feeder provides a record of actual conditions. A simple graphic voltmeter that is light and easily installed can be transferred weekly or daily from one feeder to another, thus furnishing a number of records at minimum expense.

A graphic ammeter is the simplest means for obtaining the load curve of a prospect's or customer's plant, from which maximum demand, load-factor, and diversity-factor of the connected load can be quickly determined as a basis for rates. A three-wire graphic ammeter is particularly useful for this purpose on three-wire circuits.

Mounted on the station or substation switchboard, a graphic meter of the above characteristics will give permanent records of the variation in current and voltage.

During recent years graphic meters have come into extensive use in settling disputes with customers. The records often disclose to the customer the use of power at unexpected hours, and such uses can be quickly traced when their existence is disclosed. A simple graphic meter, because it can be installed easily and quickly, is particularly adapted for such service.

These are only a few instances. There are innumerable uses for a graphic meter of this character. Locating leaks and theft of current, determining most economical hours for operating generators of various sizes, checking up the distribution of load between units, and many other uses will suggest themselves to every central-station man.

The Westinghouse Electric type U graphic meters are intended primarily for purposes where graphic meters that are easily operated, light in weight, comparatively low in price, and at the same time reasonably accurate, are required. The continuous records of the type U meters, covering a week's time on a single chart, make it possible for central stations to secure at a reasonable cost a number of records much desired, but not previously obtained because of the expense. The extended uses to which graphic meters of this class have been put have brought out points of improvement that have lately been made on the above-mentioned meter.

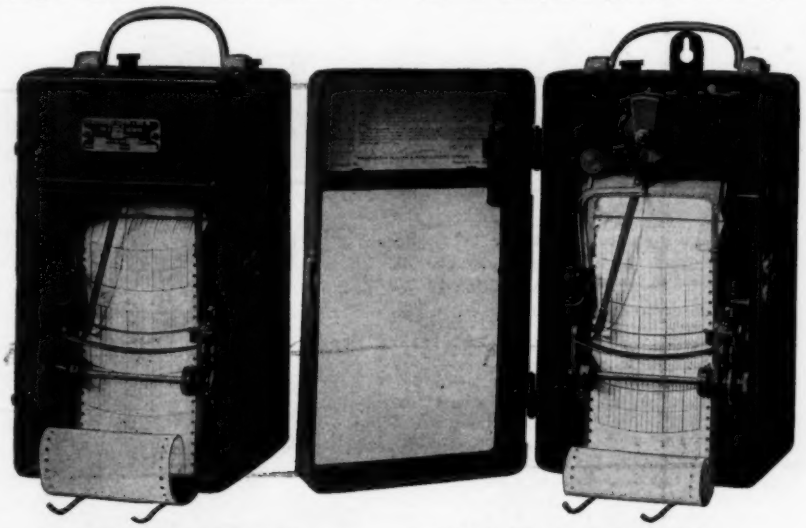
The meter consists of a solenoid and core acting directly on an arm that carries the recording pen, and a continuous strip of paper moved uniformly by a high-grade clock mechanism. To overcome the slight friction of the pen on the paper, the solenoid is made very powerful in its action. This is controlled by a heavy spring, which also minimizes inaccuracies due to slight errors in leveling.

An oil dashpot is provided to damp the action of the meters on fluctuating current or voltage. On circuits not subject to excessive fluctuations, the oil can be left out of the dashpot.

A glass ink reservoir, a new feature, which will hold a supply sufficient for three weeks or more of ordinary use, is mounted in such a way that a wick, one end of which is in the reservoir and the other in the V-shaped pen, will feed the ink into the pen as used.

The ink is furnished in liquid form and is specially prepared to give good results with the pen and paper supplied. A small clip inside the meter case serves to hold the ink phial, so that the ink is always on hand.

The record paper for these meters is of stock specially selected for satisfactory records and is accurately ruled. The hours are stamped on one margin, and an accurate drive is assured by perforations in the paper in which pins on the driving mechanism engage.



Westinghouse Graphic Meter. Graphic Meter with Door Opened.

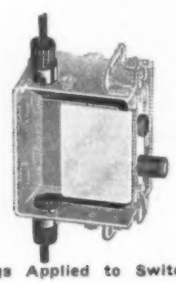
## New Bushing for Loom.

The Chicago Fuse Manufacturing Company, 1014 West Congress Street, Chicago, Ill., has placed on the market a ring or bushing adapted to hold flexible non-metallic conduit or loom in steel switch or outlet boxes, having an ordinary five-eighths-inch knockout. It is designed to meet the requirements of the National Electrical Code that outlet, junction and flush switch boxes "must be arranged to secure in position the conduit or flexible tubing protecting the wire." This rule is being increasingly enforced.

The new device is known as the loom or type "L" bushing and is very simple in construction. It consists of a single piece of metal without screws or loose parts of any kind and requires no tools for its installation. Its construction and position when installed are shown by the two cuts herewith. One of these

New Loom Bushing.

shows an ordinary push-button switch installed in a regular switch box with the side removed and illustrates the very small amount of space taken inside the box by the bushing. This is one of its principal advantages. It fits all sizes of loom regularly used in the



Bushings Applied to Switch Box.

five-eighths-inch knockout, namely, two-eighths, one-fourth and five-sixteenth-inch.

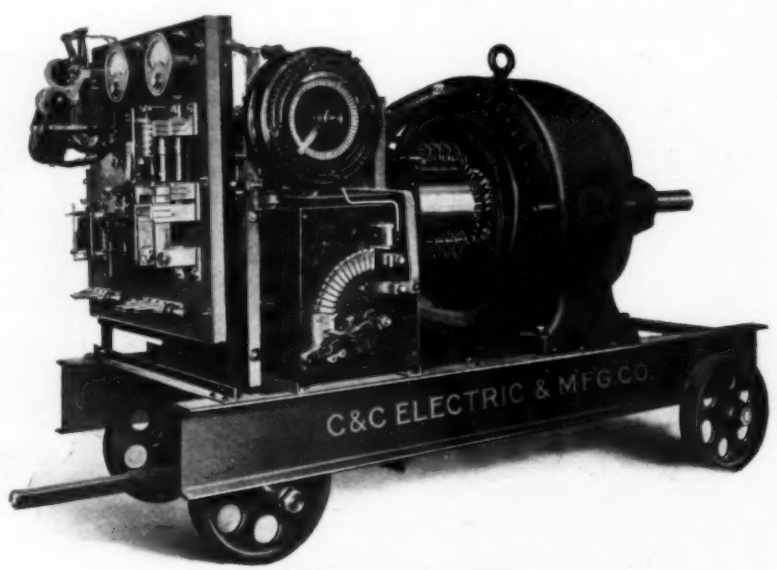
It may be inserted either from the inside or outside of the box as desired. If the former, it is installed by pushing the loom in from the outside of the box, spreading the bushing enough to let the sharp points pass over the end of the loom from inside the box to the desired position and then closing the bushing until the guiding prongs will pass through the hole. A sharp pull on the loom from the outside will then draw the bushing into place. It cannot be pulled entirely through because of stops inside the box. It cannot be pushed back because the elastic fingers bear against the outside of the box. The loom cannot be moved in the bushing because it is held by the sharp prongs forced into its outer surface.

If it is desired to remove the bushing, this may easily be done by depressing the three elastic fingers on the outside of the box and reversing the process of installing. To insert from the outside, simply reverse the bushing and slip it over the loom, then push the loom into place from the outside.

The bushing is made from spring steel and plated to prevent corrosion. It has been tested and approved by the Underwriters' Laboratories.

## Portable Arc Welder.

A new portable arc welder, having all the features of the larger stationary equipments, has been designed by the C. & C. Electric & Manufacturing Company, Garwood, N. J. The equipment is extremely flexible for welding and repair work in ship yards, machine shops, locomotive shops and foundries. The motor circuit can be connected to any available part of the shop or yard circuit.




Portable Arc-Welding Outfit.

The apparatus, consisting of dynamotor, control apparatus and switchboard, is all supported on a base of I-beams and mounted on a heavy iron truck on wheels. The welding current is generated by a 110-volt dynamotor, the generator end having a capacity of 200 amperes at 70 volts. The motor shaft is extended for receiving a pulley for belt drive by gas, oil or steam engine when in use on barges, ship yards or where electric current is not available.

As illustrated, the starting box and field-control rheostat are mounted on the frame structure supporting the switchboard. The switchboard carries the main-line switch and circuit-breaker for the motor, and automatic control relays for two individual welding circuits. A set for 400 amperes will provide for one graphite electrode or two metallic electrodes for welding. The graphite electrode gives a temperature of about 4,000 degrees centigrade and is used for cutting, pre-heating and welding with auxiliary bar. The metallic electrode for welding furnishes the welding metal directly and can be used on vertical or overhead work.

The automatic relays in each welding circuit insert and cut out small steadying resistances on drawing the arc and thereby prevent burning of the meal. Automatic devices also prevent interference between operators. An ammeter in the welding circuits permits the accurate adjustment of the current to the work.

## Prizes Stimulate Electric Signs.

The Federal Sign System (Electric) has recently completed at the Kansas City, Mo., branch an advertising prize contest that, because so successful there, may be adopted at the other branches of the system. The company provided coupons, for voting, for all stores having Federal signs or having contracted for the installation of Federal signs. The stores gave one of these tickets with each five-cent purchase, and the persons collecting the largest number of tickets or votes, won the prizes.

Among the many awards were a Victrola, a motorcycle, a gold watch, a bicycle, and a baseball outfit. The stores which had Federal signs got such advantage from the giving of tickets as is involved in the premium coupon plan. These advantages were potent in many cases in securing contracts for signs while the contest was in progress.

# Current Electrical News

## NORTH ATLANTIC STATES.

BRATTLEBORO, VT.—Residents of Dummerstown are discussing the proposition to have electric current brought to the fillate by the Connecticut River Power Company. Mr. E. Whitney, of this company, said it was willing to put in a transformer station at a cost of $2,500 and provide electricity at very reasonable figure.

BRANFORD, CONN.—Report has it that the "White Way" movement for Branford is being seriously agitated, and that a "White Way" will probably be installed by the Branford Electric Light Company.

AUBURN, N. Y.—The Empire Gas & Electric Company has been authorized to issue $137,000 in bonds, of which the electric department will expend $48,506.61 for overhead and underground conduits and cables, street-lighting equipment, and transmission lines and equipment.

CLINTON, N. Y.—Jersey Electric Company has been incorporated to distribute electric current for light, heat and power. The capital stock is $250,000, and the incorporators are Charles S. Johann, Frederick G. Simmons and Foster N. Voorhees.

LYONS, N. Y.—The Central New York Gas & Electric Company is authorized to issue $128,000 of its five-per-cent first-mortgage gold bonds, of which the electric department will expend a total of $83,562.48 for poles, fixtures, line transformers, etc., distribution system, service lines and meters in Geneva, Waterloo and Seneca Falls.

NEW YORK, N. Y.—The Lebanon Valley Lighting Company, Incorporated, has filed articles of incorporation, capitalized at $500. The incorporators are Frederic W. Munch, of Dalton, Mass.; Mary L. Munch, Indian Orchard, Mass.; and Robert W. Munch, Binghamton, N. Y.

JOHNSTOWN, PA.—According to the statement made before the City Council recently by General Manager and Vice President H. H. Weaver and Superintendent P. J. Morrissey of the Citizens Light, Heat & Power Company of Johnstown, it will cost the company approximately $50,000 to place its wires underground to comply with the city ordinance regulating the same. S.

LANCASTER, PA.—The charter of the New Holland Electric Company has been received for record. The company will manufacture light and power for New Holland and vicinity. The capital stock is $5,000, and the incorporators are S. R. Zimmerman, J. Guy Eshleman and John S. Galt.

PITTSBURGH, PA.—Applications for four Pennsylvania charters of incorporations for the following concerns: Penn Township Electric Company, Adams Township Electric Company, Cranberry Township Electric Company and Forward Township Electric Company, will be made by H. L. Mitchell, L. C. Lamb and R. M. Evans. The new concerns will supply light, heat and power by electricity in the townships of Butler County, Pa. S.

PITTSBURGH, PA.—Charters have been granted to A. W. Stevenson, J. R. McNary, E. W. Washabaugh, A. W. Robertson and L. F. Kane, of Pittsburgh, for four electric companies to operate in Beaver County, Pa. The companies take the names of the districts where they are to operate as follows: Hanover Light Company, Hanover township; Greene Township Light Company, Green township; Independent Light Company, Independence township, and Raccoon township Light Company, Raccoon township. Each one is to have a capital of $5,000 and the offices will be at New Brighton. S.

STEELTON, PA.—The City Planning Commission is preparing plans for an electric coal elevator for the Paxton Street wharf. Address Edgar Z. Wollowes, superintendent, for further particulars.

## SOUTH ATLANTIC STATES.

DOVER, DEL.—Iowa Gas & Electric Company has been incorporated with a capital of $500,000 by M. M. Hirons and others.

FAYETTE, W. VA.—Bonds to the amount of $50,000 will be issued by the Fayette & Fayetteville Traction Company for the purpose of providing funds to complete the construction of the road, including provision for power and the transmission of current. L.

WHEELING, W. VA.—J. W. Hopwood, electrical engineer, will have charge of building a $26,000 power plant for the Wheeling Traction Company.

RALEIGH, N. C.—A committee recently appointed by the Chamber of Commerce with Col. Joseph E. Pogue as chairman, has charge of the "Great White Way" lighting improvement for this city.

## NORTH CENTRAL STATES.

CANTON, O.—Gas-filled lamps of 250 candlepower, to the number of 55, will replace arc lamps being used in Canton, O., according to action taken by the City Council, the new lights to be placed by the lighting company conditionally. They are to be used for six months and removed if not satisfactory or if terms of purchase cannot be agreed upon. L.

CHILLICOTHE, O.—The transfer of the Chillicothe Electric Street Railway, Light & Power Company to the American Gas & Electric Company has been effected. Negotiations are pending for the plants at some neighboring towns. It is stated that the Chillicothe plant will be converted into a large central power station, similar to that now operated by the same corporation at Newark, O., with the object of furnishing current to a number of small municipalities in this general territory. J.

CINCINNATI, O.—Some additional equipment for the extension of the service and plant of the Loveland, O., electric power station will probably be purchased by the Loveland Light & Water Company, recently organized to take over the plant. The capital stock of the new company is $50,000.

EATON, O.—The Council has granted a franchise to the Eaton Electric Light Company to furnish electric lighting. Address the secretary for further information.

HURON, O.—The city electric lighting system will be extended to several suburbs not yet covered, according to a decision of the Board of Public Affairs, at a cost of about $500. L.

LOGAN, O.—The Ohio Light & Power Company will augment its electrical station at this point. The manager states that three new engines will be installed and change made from steam to gas power. It is further announced that many thousands of dollars will be spent by the company in improving its plants at near-by surrounding points where it has franchises.

MARION, O.—Several new street lights and some other extensions of lighting service will be provided for by the City Council, if funds are found to be available for that purpose. L.

OTTOVILLE, O.—Power and distribution equipment will be required for the construction of a small lighting system for the town, for which $3,000 is available following the recent sale of bonds for that purpose. L.

TOLEDO, O.—The Ohio Public Utilities Commission has authorized the Auglaize Power Company, which controls waterpower concessions in the Auglaize River at Defiance, to issue $666,000 six-per-cent preferred stock. The proceeds will be used to pay accounts due, purchase additional flowage lands for the hydroelectric plant, erect an auxiliary steam reserve station and for additions and extensions to transmission and distributing lines. Address William P. Wallace, general manager, 501 Spitzer Building, Toledo.

URBANA, O.—Extension of the lines of the Urbana Light Company to North Lewisburg will be begun shortly, the contract calling for completion of the work by October 1. A change in voltage from the old service supplied by a traction line will require consumers to provide themselves with equipment. New center-span street lighting will be installed. J.

BREMEN, IND.—Improved electric light service is being considered by the City Counsel. Address the city clerk.

GARY, IND.—Attorneys representing petitioners of Gary have filed a petition with the Pubilc Service Commission, asking the commission to give

them authority to accept a new franchise from the city of Gary to establish a second lighting plant there. The petitioners include Charles H. Maloney, Henry A. Vossler and Ingwald Moe, all of Gary.

MT. STERLING, ILL.—The city's contract with the Central Illinois Public Service Company expires within a year, and a stock company may be organized to establish a light and ice plant. Address the city clerk in regard to this proposition.

SOUTH CHICAGO, ILL.—The Commonwealth Edison Company has purchased a site for erecting a large electrical power plant in South Chicago.

WAUKEGAN, ILL.—Owing to the insufficient number of bids submitted for the installation of the boulevard lighting system on Genesee and Washington Streets, the Committee headed by Mayor Bidinger rejected all proposals.

MT. MORRIS, MICH.—The Council is planning ways and means to secure electric lighting. Address Clerk Montney for desired information.

POTTERVILLE, MICH.—At the last meeting of the Business Men's Association a committee was appointed to investigate the project of installing electric lighting in Potterville. Address the town clerk for further particulars.

SCHOOLCRAFT, MICH. — The Schoolcraft County Power Company has been incorporated with a capital of $5,000. This indicates that Manistique will have another company, having for its object the development and utilization of the waterpower available in the Manistique River. Address secretary for desired information regarding the project.

MONTELLO, WIS.—A new power company to supply light and power to this village has been incorporated under the name of the Montello & Harrisville Light & Power Company. The capital stock is $40,000 and the incorporators are D. W., L. M., C. R. and Vincent McNamara, and L. G. Miller.

SCHLEISINGERVILLE, WIS. — The council is planning ways and means to install a $6,000 lighting plant. Address the town clerk for information.

CHARTER OAK, IOWA.—The special election to decide whether or not to issue bonds for the construction of new lighting plant for the city gave a majority in favor of the project.

PRIMGHAR, IOWA.—The council is planning ways and means to install a lighting plant. Address the city clerk for information.

RENWICK, IOWA.—Bonds have been voted for an electric light plant. Address City Clerk.

TRAER, IOWA.—$1,200 has been submitted for improving the electric lighting. The wires will be placed under ground. Address the city clerk for information.

CLARENCE, MO. — The $10,000 electric-light bond issue is being readvertised for sale August 24, no satisfactory bids having been received August 10. M.

KANSAS CITY, MO. — Tuttle & Pike, with offices in the Shubert Theater Building in this city, have been awarded the contract for preparing plans and specifications and for superintending the work of construction of a power transmission line from the electric plant at Gladstone, Mo., to the town of Armstrong, Mo. Bids for the work will be advertised for in a few weeks. M.

BOWBELLS, N. D.—A franchise has been granted to the Soule Brothers for the erection and installation of an electric lighting plant.

KANSAS CITY, KANS.—The City Commissioners are asking a bond issue of $450,000 to double the capacity of the municipal electric light plant, so that large users of power who now buy from the Standard Light Company can patronize the municipal plant. The earnings for the municipal light plant are not sufficient to care for extensions and improvements required by rapidly increasing demand and city growth. M.

## SOUTH CENTRAL STATES.

CAVE CITY, KY.—Installation of an electric light plant is under consideration by promoters of a local ice-manufacturing concern. G.

FRIENDSHIP, TENN.—An electric light plant, as well as a water-works system, is projected by the Business Men's League, of which W. C. James is secretary. G.

OKLAHOMA CITY, OKLA.—A state charter has been granted by the secretary of state of Oklahoma to the McAlester Electric Light & Power Company of McAlester, Okla. The authorized capital stock is $10,000 and the incorporators are J. B. McAlester, W. B. McAlester and E. A. Daniels, all of McAlester. P.

MARBLE FALLS, TEX. — The Council plans to install a light and water plant. Address the mayor in regard to the matter.

## WESTERN STATES.

BUTTE, MONT.—A $100,00 switchboard will be installed by the Bell Telephone Company in the local plant. Other improvements including the extension of the lines, burying cables, etc., will be made. O.

SEARCHLIGHT, MONT. — An electric light and power plant is to be built here in the immediate future by the firm of Place and Donaldson. Preliminary arrangements have been completed and work of constructing the plant will begin in the immediate future.

GRAND JUNCTION, COLO. — The Council plans to establish a municipal lighting plant. Address H. F. Vorbeck, commissioner, for information.

LOVELAND, COLO.—At a special taxpayer election votes were in favor of a $120,000 municipal lighting system for Loveland, and the city aldermen were authorized to proceed with the completion, a bond issue proposition to be voted on at the general election in November. Plans provide for the erection of a hydrogenerating plant at the Big Thompson River 12 miles west of the city.

SANTA FE, N. M.—To build a dam at White Rock Canyon of the Rio Grande, about forty miles north of Albuquerque, is the purpose of the Rio Grande Light, Heat & Power Company, which has been incorporated with a capital stock of $1,000,000, by Charles L. Wilfong, James Morrison and F. E. Wilson. The company proposes to generate hydroelectric power at the dam, sufficient for lighting, heating and power purposes for Albuquerque, Santa Fe and Las Vegas.

GREENRIVER, UTAH.—Residents here have voted in favor of bonding the city for $200,000 for the erection of a municipal lighting plant.

SALT LAKE CITY, UTAH.—Articles of incorporation have been filed by the Salt Lake Light & Traction Company, capitalized at $1,000,000. The incorporators are O. J. Salisbury, S. A. Whitney, C. S. Johnson, A. H. Parsons and J. B. Salisbury. Mr. J. B. Salisbury is president. The company will engage in the business of furnishing electrical light, heat and power, etc.

DUNCAN, ARIZ.—J. E. Allen, one of the owners of the present electric light plant here, reports the purchase by himself and associates of a building in the Head addition, in which will be installed in the near future a complete new plant.

CHEHALIS, WASH.—A franchise has been granted B. F. Walling to operate an electric light and power system in this city.

EVERETT, WASH.—The Edmonds Electric Light & Power Company has been granted a franchise over certain roads in Snohomish county.

PE ELL, WASH.—A power dam, to cost approximately $20,000, is to be built here soon by the Central Light & Power Company of Centralia, Wash. This company also contemplates making additions and improvements to the local power plant. O.

EUGENE, ORE.—M. L. Bugbee, a prominent engineer of Spokane, Wash., and one of the stockholders of the Waldo Lake Irrigation Company, in a recent statement, intimated that his company will build a gigantic electric plant on Waldo Lake. Simon Klovdahl, engineer for the company, has been making preliminary investigations. O.

HOOD RIVER, ORE.—Filings for the development of 2,000 horsepower on Hood River have been completed by August Guigard, who contemplates the construction of a plant of above named capacity near this city. The power generated will be used to supply Hood River and the Hood River Valley with current for both light and power. O.

PORTLAND, ORE.—F. L. Mack, of this city, will construct a power transmission line from the power station of the Portland Railway, Light & Power Company, at Bull Run, to the city of Sandy, where the company has a franchise for furnishing light and power. Work will be started as soon as materials can be placed on the site of the project. O.

CARPINTERIA, CAL.—Plans are under way for the erection of a substation here for the Holton Electric Company.

ESCONDIDO, CAL.—The sale of the Escondido Utilities Company was consummated here, the purchasers being O. E. Freeman and Frank C. Woodford of Boise, Idaho. After reorganization a day plant for furnishing power for manufacturing industries, irrigation and linotype machines will be installed. The old plant operated only at night.

VENTURA, CAL.—A petition has been presented to the City Council, signed by 500 residents, asking the trustees to call an election to vote bonds for the establishment of an electric light and gas plant in this city.

## PROPOSALS.

LIGHTING EQUIPMENT.—Proposals will be received until noon, September 11, for furnishing labor and material for the installation of electric lighting fixtures and other electrical equipment at the Lima State Hospital, Lima, O., by George E. Whitney, secretary, Lima State Hospital Commission, Columbus, O.

L.

CONVERTER.—Sealed proposals will be received at the Bureau of Yards and Docks, Navy Department, Washington, D. C., until August 29 for two 500-kilowatt rotary-converter sets for the Navy Yard, Philadelphia, Pa. Specifications can be obtained upon application to the Bureau or to the commandant of the navy yard named.

WATERWORKS AND LIGHTING PLANT.—Sealed proposals will be rereived at the offices of Bartlett & Ranney, Incorporated, consulting engineers, 108 East Crockett Street, San Antonio, Tex., until August 24, for constructing a waterworks and lighting plant, at George West, Tex. The total cost is estimated at $45,000.

ELECTRIC FREIGHT ELEVATOR.—Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until August 31, for the installation, complete, of an electric freight elevator, miscellaneous changes, etc., in the postoffice at Columbus, O., in accordance with drawings and specifications, copies of which may be obtained at the discretion of the Supervising Architect.

HOSPITAL WIRING.—The Department of Charities, of Pittsburgh, Pa., is receiving bids on the electrical wiring that is to be done on the two new pavillions and the present cottage buildings of the City Home and Hospital at Marshalsea Station, Pa. Plans and specifications can be obtained at the office of John P. Brennan, city architect, North Side Municipal Building, corner Ohio and Federal Streets, Pittsburgh.

INTERIOR LIGHTING FIXTURES.—Sealed proposals will be received until September 24 for the interior lighting fixtures of a one-story building for the post office at Mandan, N. D., and until October 6 of a one-story building for the post office at Uvadale, Tex., in accordance with drawings and specifications, copies of which may be obtained from the custodians of the sites named or the office of the Supervising Architect.

ELECTRICALLY DRIVEN DRAINAGE PUMP.—Bids will be received until August 26 by the Commissioners of the Banner Special Drainage & Lever District, Pekin, Ill., for the furnishing and operating as a part of the drainage system of the said district, a complete electrically-driven drainage pumping plant. The work is divided in three sections, as follows: Section I, machinery; section II, foundation; section III, building. Plans and specifications are on file and may be seen at the offices of the Harman Engineering Company, 144 Fredonia Avenue, Peoria, Ill., and at the office of Attorney W. R. Curran, Pekin, Ill.

ELECTRIC LIGHTING SYSTEM.—Bids will be received until August 25 for labor and materials required in the construction of an electric lighting system, to be constructed for the Westbrook Electric Light & Power Co., Westbrook, Minn. Bids will be received according to plans and specifications which are on file in the office of P. C. Hiebert, Westbrook, Minn., and also in the office of Earle D. Jackson, consulting engineer, St. Paul, Minn., and may be there examined. The work is divided into three parts: Part 1 consisting of furnishing and erecting one 37 5-kilowatt-ampere 1,200-revolutions-per-minute three-phase, 60-cycle alternator with belted exciter, switchboard, etc. Part 2 consists of furnishing and erecting poles, wires, street lamps, transformers, etc., for the electrical distribution system in the village of Westbrook. Part 3 consists of furnishing f. o. b. cars, Westbrook, Minn., but not erecting, material for electrical distribution system. Address P. G. Hiebert, secretary, Westbrook, Minn.

ELECTRIC LIGHT PLANT.—Sealed proposals will be received for the furnishing of all labor, material and equipment entering into the extensions and improvements to the waterworks system, and an electric light plant for Parker S. D., in accordance with plans and specifications drawn therefor by J. F. Druar, the Oscar Claussen Engineering Company, St. Paul, Minn. The contemplated work to be furnished and installed is as follows: Division No. 1: Extensions to the present distribution system with all accessories installed complete. Divisions Nos. 2 and 3: The furnishing of all labor and material and the building of a brick power station with all accessories. Division No. 4: The furnishing and installation complete of oil engines, auxiliary apparatus and all accessories. Division No. 5: The furnishing and installation complete of generators, exciters, switchboard, motor for pump, and all accessories. Division No. 6: The furnishing and installation of pole line and wiring street lighting system, together with all accessories. Address C. L. Jones, city auditor, Parker, S. D.

## FINANCIAL NOTES.

The Pacific Gas & Electric Company announces that having secured subscriptions for more than 70 per cent of its issue of $12,500,000 of new first-preferred stock, the financial plan outlined in a letter to the stockholders dated June 3, was declared operative at a meeting of the Board of Directors Aug. 15th. The subscriptions, which exceed $8,750,000, were received from approximately 3,000 subscribers, of whom a great proportion are new stockholders.

### Reports of Earnings.

| | Term | Dividends Rate | Payable |
|---|---|---|---|
| Cent. Miss Val. Elec. Prop. | Q | $1.50 | Sept. 1 |
| Gen. Elec. | Q | 2% | Oct. 15 |
| Phila. Elec. | Q | 1.75% | Sept. 15 |

KEYSTONE TELEPHONE.

| | 1914 | 1913 |
|---|---|---|
| July gross | $111,468 | $105,668 |
| Net after taxes | 54,939 | 51,086 |
| Surplus after charges | 28,707 | 25,319 |
| 7 months gross | 767,715 | 731,839 |
| Net after taxes | 387,872 | 360,558 |
| Surplus after charges | 206,056 | 183,294 |

REPUBLIC RAILWAY & LIGHT.

| | 1914 | 1913 |
|---|---|---|
| June gross | $248,874 | $248,792 |
| Net after taxes | 98,863 | 93,453 |
| Balance after interest and amortization | 41,287 | 35,066 |
| Surplus after preferred dividends | 15,330 | 9,109 |
| Twelve months gross | 3,093,847 | 2,844,333 |
| Net after taxes | 1,210,682 | 1,086,739 |
| Balance after interest and amortization | 506,224 | 454,237 |
| Surplus after preferred dividends | 194,515 | 142,318 |

LAKE SHORE ELECTRIC RAILWAY.

| | 1914 | 1913 |
|---|---|---|
| June gross | $127,202 | $129,353 |
| Net after taxes | 50,501 | 53,491 |
| Surplus after charges | 15,031 | 18,176 |
| Six months' gross | 658,106 | 635,699 |
| Net after taxes | 226,450 | 223,608 |
| Surplus after charges | 14,739 | 13,322 |

CLEVELAND, PAINESVILLE & EASTERN RAILROAD.

| | 1914 | 1913 |
|---|---|---|
| June gross | $ 42,596 | $ 40,988 |
| Net after taxes | 21,135 | 19,257 |
| Surplus after charges | 10,060 | 8,861 |
| Six months' gross | 196,292 | 188,539 |
| Net after taxes | 88,563 | 81,944 |
| Surplus after charges | 22,630 | 19,399 |

FEDERAL LIGHT & TRACTION.

And subsidiary companies for three months and 12 months ended June 30, 1914:

| | 1914 | 1913 |
|---|---|---|
| Three months' gross | $ 574,096 | $ 565,663 |
| Net after taxes | 194,270 | 216,305 |
| Balance after charges | 50,443 | 82,655 |
| 12 months' gross | 2,374,733 | 2,349,165 |
| Net after taxes | 826,490 | 954,985 |
| Balance after charges. | 265,802 | 462,266 |
| Preferred dividend Central Arkansas Railway & Light | 84,000 | |
| Preferred dividends Federal Light & Traction | 150,000 | |
| Balance | 31,802 | |

WESTERN RAILWAYS & LIGHT.

For three months and twelve months ended June 30, 1914:

| | 1914 | 1913 |
|---|---|---|
| Three months' gross | $ 647,021 | $606,762 |
| Net after taxes | 245,699 | 220,070 |
| Surplus after charges. | 62,476 | 67,003 |
| Twelve months' gross. | 2,654,178 | 2,439,503 |
| Net after taxes | 1,051,649 | 924,620 |
| Surplus after charges. | 377,388 | 345,504 |
| Balance after preferred dividends | 187,248 | 165,399 |

WESTERLY LIGHT & POWER.

Three months and twelve months ended June 30, 1914:

| | 1914 | 1913 |
|---|---|---|
| Three months' gross | $ 30,253 | $ 27,619 |
| Net after taxes | 12,232 | 10,810 |
| Surplus after charges | 6,751 | 5,547 |
| Twelve months' gross. | 130,881 | 122,135 |
| Net after taxes | 57,555 | 55,717 |
| Surplus after charges. | 35,511 | 35,155 |

ILLINOIS TRACTION.

Three months and twelve months ended June 30, 1914:

| | 1914 | 1913 |
|---|---|---|
| Three months' gross | $2,059,942 | $1,867,529 |
| Net after taxes | 757,834 | 751,035 |
| Surplus after charges. | 164,409 | 244,488 |
| Balance after preferred dividends | 57,377 | 145,056 |
| 12 months' gross | 8,306,666 | 7,661,678 |
| Net after taxes | 3,417,267 | 3,234,519 |
| Surplus after charges. | 1,193,564 | 1,232,079 |
| Balance after preferred dividends | 769,885 | 853,607 |

ELMIRA WATER, LIGHT & RAILROAD.

Three months ended June 30, 1914:

| | 1914 | 1913 |
|---|---|---|
| Gross earnings | $272,840 | $240,337 |
| Net after taxes | 102,003 | 88,223 |
| Surplus after charges | 33,915 | 21,832 |
| Balance after first preferred dividend | 19,040 | ..... |

NORTHERN ILLINOIS LIGHT & TRACTION.

Three months and twelve months ended June 30, 1914:

| | 1914 | 1913 |
|---|---|---|
| Three months' gross | $ 63,375 | $ 52,242 |
| Net after taxes | 29,344 | 22,751 |
| Surplus after charges | 19,734 | 15,164 |
| Twelve months' gross | 243,207 | 208,702 |
| Net after taxes | 115,448 | 91,534 |
| Surplus after charges | 80,963 | 61,391 |

PORTLAND RAILROAD.

| | 1914 | 1913 |
|---|---|---|
| June gross | $ 93,108 | $ 93,150 |
| Net after taxes | 37,524 | 30,333 |
| Surplus after charges | 17,381 | 19,119 |
| Twelve months' gross | 1,046,674 | 1,007,479 |
| Net after taxes | 403,807 | 296,239 |
| Surplus after charges | *156,246 | 171,236 |

*Equivalent to 7.8 per cent on capital stock.

## PERSONAL MENTION.

MR. W. T. WALLACE, general manager of the Great Shoshone & Twin Falls Water Power Company, Twin Falls, Idaho, is in Salt Lake City, Utah, in connection with the extension of his company's business.

MR. A. B. DUNGAN, an electrical engineer of Wilkes Barre, Pa., has recently gone to Ellwood, Ind., where he has been engaged to make a complete electrolytic survey for the water company of that place.

MR. B. F. BOYNTON, claim agent of the Portland Railway, Light & Power Company, Portland, Ore., was elected chairman of the committee appointed by the mayor, composed of prominent men of Portland, to investigate the general condition of the city and report to him with suggestions and recommendations to make Portland a safer municipality.

Mr. W. R. McCANN, supervisor in the former Division of Erection, Panama Canal, has resigned and, accompanied by Mrs. McCann, returned to the United States. He was appointed to the Canal Service on October 21, 1907, and upon arrival on the Isthmus, was assigned to duty at Culebra in the old Department of Lock and Dam Construction. He resigned on October 12, 1908, to take a special two-year course in engineering at the University of Wisconsin, but was reappointed to the Canal Service on June 18, 1910, as assistant engineer in the First Division. Under the direction of the electrical and mechanical engineer, he designed the entire transmission system of the Panama Canal, and as supervisor has had charge of its installation, remaining to see the work nearly completed. From July 27 to September 1, 1913, he was on detached duty in the United States to supervise electrical and structural-steel drawings of the four new substations, material for which was urgently required by the Panama Canal. Prior to coming to the Isthmus, he was with the Chicago Edison Company from 1904 to 1907, and again in the summer of 1909. Recently he has been engaged in the preparation of a thesis on the transmission system, to be submitted to the University of Wisconsin for a master's degree. He is a member of the American Institute of Electrical Engineers, and is secretary-treasurer of the Panama Section of that organization; he is also an associate member of the American Society of Civil Engineers and a member of the Society for the Promotion of Engineering Education.

## OBITUARY.

MR. IRWIN C. COOPER, for more than twenty-three years manager of the Trenton branch of the Postal Telegraph Company, died recently in St. Francis Hospital, Trenton, N. J., at the age of 58 years. He suffered a fall some time ago never recovering from its effects.

MR. HENRY LEWIS OESTREICH, senior assistant division engineer, Public Service Commission for the First District of New York, died on August 13 at Atlantic City, N. J., where he had been for eight weeks suffering from septic poisoning. He was in his 45th year. Mr. Oestreich was graduated from the New York University in 1888 with the degree of Civil Engineer. In May, 1900, he joined the staff of the Board of Rapid Transit Railroad Commissioners and continued with it and the Public Service Commission, its successor, until his death. During the construction of the existing New York Subway, he was in charge as assistant engineer of the section of construction on Lafayette Street and Fourth Avenue, between Great Jones Street and Nineteenth Street. Later he had charge of important construction for the Center Street loop. When the construction of the Fourth Avenue Subway in Brooklvn was begun, Mr. Oestreich was made assistant to the division engineer and under the latter was in charge of all the work on that important section of subway as well as of the elevated extensions in Brooklyn. Mr. Oestreich was married June 10 last to Miss Stella Bell Eccles, of Trenton, N. J.

## NEW INCORPORATIONS.

NUTLEY, N. J.—The Telephone Toll-o-Meter Sales Company has been incorporated with a capital of $100,000 to take over the properties of the Toll-o-Meter Company of Hartford, Conn. Anthony Dwyer, A. J. Steelman, and L. Edward Herrmann are the incorporators. A.

## FOREIGN TRADE OPPORTUNITIES.

*[Where addresses are omitted they may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., and at the branch offices of the Bureau, 315 Custom-house, New York, N. Y., 629 Federal Building, Chicago, Ill., Association of Commerce Building, New Orleans, La., and 310 Custom-house, San Francisco, Cal. Apply for addresses in letter form, giving file numbers.]*

NO. 13506. X-RAY APPARATUS.—A French business house informs an American consulate that it wishes to get in touch with American manufacturers of X-ray apparatus. Copies of correspondence should be sent to the consulate referred to.

NO. 13511. ELECTRICAL APPARATUS, MOTORS, DYNAMOS, ETC.—A European business house handling electrical apparatus, ventilators, electric motors, dynamos, etc., would like to receive catalogues and prices from American manufacturers of such articles. Copies of American publications on electricity are also desired.

NO. 13515. ELECTRIC RAILWAY CONSTRUCTION.—An American consul reports that an agreement has been made to extend an electric railway now in operation between two towns in his district. The name of the person who will have charge of all matters connected with the construction of the extension accompanied the report.

NO. 13,519. ELECTRIC RAILWAY CONSTRUCTION.—A report from an American consul states that an application has been made for a concession permitting the construction of an electric railway between certain points in his district. The project is divided into three concessions which are to be consolidated and sold, as the concessionaires do not contemplate building the road themselves.

NO. 13,541. ELECTRIC COMMERCIAL CARS.—In view of improved facilities for the supply of current, there is an opening in a South African city for the sale of a limited number of electric commercial cars, having a capacity of half a ton to two or three tons. An established agent now selling gasoline-driven trucks (British make) informs an American consular officer that he wishes to secure the agency for an electric car. Manufacturers are requested to send duplicate copies of correspondence and catalogs, giving prices and terms to dealers, to the consular officer referred to.

## NEW PUBLICATIONS.

PUBLIC SERVICE COMMISSION OF MARYLAND.—The annual report of the Public Service Commission of Maryland, covering its proceedings for the year 1913 and including 52 tables of utility statistics, has been published. The report forms a volume of 764 pages. Benjamin T. Fendall, Baltimore, Md., is secretary of the Commission.

FIRE APPLIANCES.—Underwriters Laboratories, Incorporated, Chicago, Ill., have issued the semi-annual revised list of manufacturers of fire appliances. This covers devices, materials and apparatus which may be of service in retarding, extinguishing or indicating fires. Where used they should be installed throughout in accordance with the rules of the National Board of Fire Underwriters. The list is divided into three parts: (1) fire-extinguisher apparatus, (2) fire retardants, (3) signaling apparatus.

MINNESOTA RAILROAD COMMISSION.—The twenty-ninth annual report of the Railroad and Warehouse Commission of the state of Minnesota, covering the year ended November 30, 1913, has been issued in book form, the volume containing 863 pages. It reports the work of the Commission and its departments for the year, gives statistical tables from the annual reports of steam railways, express companies and interurban electric railways, gives the full text of the United States Supreme Court decision in the famous Minnesota rate case, etc.

ANNUAL REPORT OF COMMISSIONER OF PATENTS.—The annual report of the Commissioner of Patents, United States Patent Office, covering the year 1913, has been published in book form. The main part of the report itself, reviewing the activities of the Patent Office, covers 14 pages; a summary of this portion of the report has been published in the ELECTRICAL REVIEW AND WESTERN ELECTRICIAN for February 28, 1914. The bulk of the volume is taken up by apppended alphabetical lists of patentees and inventions patented during the year. The entire volume consists of about 1,110 pages.

DEPARTMENT OF GAS AND ELECTRICITY, CHICAGO. — The seventeenth annual report of the Department of Gas and Electricity, of the city of Chicago, Ill., covering the year 1913, has been published as a book of 115 pages. It reviews the varied activities of this department and the special investigations it has made on electrolysis and other utility problems. A progress report on the rehabilitation of the city's electric street-lighting system is given, showing views of the lamps in use, streets newly equipped, substations, subway, lighting, etc.

THE USE OF ELECTRICITY ON THE WITWATERSRAND.—The South African Institute of Electrical Engineers has published a series of tables giving interesting statistics regarding the use of electricity on the Witwatersrand in the South African mining district. It gives a summary of the generating, transmission, distribution and operating systems of the 10 chief electrical power organizations in that district; also details of the various types of motor equipment used in numerous mining properties. A special

table gives details on the generation of compressed air, both by steam-turbine and synchronous-motor-driven compressors. The final table gives some particulars of the largest electrically driven hoisting engines on the Rand.

SALEM CONFLAGRATION.—A special report on the conflagration which occurred in Salem, Mass., on June 25 and 26 of this year, has been issued by the National Fire Protection Association, 87 Milk Street, Boston, Mass. This report reviews the conditions existing prior to the fire and gives a detailed account of the disaster. Many illustrations of views taken in the burned district are shown; also diagrams, plats and map of the burned area. The report points out clearly that most of the buildings were of wood, and therefore instead of offering any resistance, helped promote the conflagration. Notable among the few buildings that escaped destruction was the concrete power house of the Salem Electric Lighting Company. Copies of this report can be obtained from the secretary of the Association for ten cents each.

WORK DONE. — Westinghouse, Church, Kerr & Company, engineers and constructors, of New York, have just issued a fifty-page handsomely printed and well illustrated booklet entitled "Work Done," being an edition showing some of the work which this well known engineering house has done for industrial plants. Among the factories and plants described are those of the American Brake Company, St. Louis, Mo.; J. I. Case Threshing Machine Company, Racine, Wis.; Federal Rubber Manufacturing Company, Cudahy, Wis.; Gamewell Fire Alarm Telegraph Company, Newton Upper Falls, Mass.; Hart Manufacturing Company, Hartford, Conn.; Northwestern Brass Company, Calgary, Canada. The general offices of the company are located at 37 Wall Street, New York City, and its branch offices are located in Boston, Chicago, Los Angeles, San Francisco, Montreal, Vancouver, and Winnipeg.

### DATES AHEAD.

New England Section, National Electric Light Association. Sixth annual convention, Narragansett Pier, R. I., September 2-4. Secretary Miss O. A. Bursiel, 149 Tremont Street, Boston, Mass.

The Colorado Electric Light, Power and Railway Association. Twelfth annual convention, Glenwood Springs, Colo., September 3-5. Secretary, Thomas F. Kennedy, 900 Fifteenth Street, Denver, Colo.

Pennsylvania Electric Association. Annual convention, Eagles Mere, Pa., September 8-11. Secretary, S. E. Pohe, Bloomsburg, Pa.

Northwest Electric Light & Power Association. Annual convention, Spokane, Wash., September 8-11. Secretary, Norwood W. Brockett, Puget Sound Traction, Light & Power Company, Seattle, Wash.

American Institute of Electrical Engineers. Pacific Coast convention, Spokane, Wash., September 9-11. Secretary, F. L. Hutchinson, 29 West Thirty-ninth Street, New York, N. Y.

Electrical Supply Jobbers' Association. Regular quarterly meeting, Clifton Hotel, Niagara Falls, Canada, September 9-11. General secretary, Franklin Overbaugh, 411 South Clinton Street, Chicago.

Association of Iron and Steel Electrical Engineers. Annual convention, Cleveland, O., September 14-19. Secretary, W. T. Snyder, McKeesport, Pa.

Association of Edison Illuminating Companies. Annual convention, White Sulphur Springs, W. Va., September 14-17. Secretary, George C. Holberton, San Francisco, Cal.

Old-Time Telegraphers' and Historical Association and Society of the United States Military Telegraph Corps. Thirty-third annual reunion, Kansas City, Mo., September 15-17. Secretary of Old-Timers, F. J. Scherrer, 30 Church Street, New York. Secretary, Military Telegraph Corps, David Homer Bates, 658 Broadway, New York.

International Association of Municipal Electricians. Annual convention, Atlantic City, N. J., September 15-18. Secretary, C. R. George, Houston, Tex.

Illuminating Engineering Society. Annual convention, Cleveland, O., September 21-25. Assistant secretary, Joseph Langan, 29 West Thirtyninth Street, New York, N. Y.

American Electrochemical Society. Twenty-sixth general meeting, Niagara Falls, N. Y., October 1-3. Secretary, Joseph W. Richards, South Bethlehem, Pa.

American Electric Railway Association. Annual convention, Atlantic City, N. J., October 12-16. Secretary, E. B. Burritt, 29 East Thirty-ninth Street, New York, N. Y.

Jovian Order. Annual congress, St. Louis, Mo., October 14-16. Mercury, Ell C. Bennett, Syndicate Trust Building, St. Louis, Mo.

Electric Vehicle Association of America. Fifth annual convention, Philadelphia, Pa., October 19-21. Secretary, A. J. Marshall, 29 West Thirty-ninth Street, New York, N. Y.

Telephone Pioneers of America. Annual reunion, Richmond, Va., October 29-30. Secretary, Henry W. Pope, New York City.

# With the Electrical Manufacturers

**Adams, Bagnall Electric Company,** Cleveland, O., has secured a contract from the Municipal Electric Light Department of the City of Cleveland, for 250 lighting transformers ranging in size from one to 25 kilowatt.

**The Sireno Company,** 18 Rose Street, New York City, has issued a catalog of the Sireno electric warning signals and accessories for automobiles, boats and motorcycles. Several types of this outfit are made, all of which are well described and illustrated in the catalog.

**Kandem Electric Company, Incorporated,** formerly known as the Koerting & Mathiesen Company, 51 East Twenty-first Street, New York, N. Y., has issued some circulars contrasting the performances of nitrogen-type tungsten lamps with the Excello flame-arc lamp.

**National Metal Molding Company,** Pittsburgh, Pa., has issued an unique publication in the form of a looseleaf book containing the conduit sections of electrical ordinances of numerous cities and towns throughout America. The publication is printed on handsome brown paper and is of pocket size. Copies of this publication can be obtained free of charge by writing to the company.

**Hotpoint Electric Heating Company,** Ontario, Cal., is sending out to dealers of electrical appliances, special circulars and announcement of a new national advertising campaign, which will be carried on in the near future. This covers particularly the company's El Tosto toaster and El Comfo heating pad.

**A. C. Mannweiler,** Fort Wayne, Ind., maker of miniature incandescent lamps, is building an addition to his factory which will double its present capacity. Mr. Mannweiler is now making a complete line of miniature lamps for all purposes. He is one of the pioneers in his line, and reports splendid business.

**Pass & Seymour, Incorporated,** Solvay, N. Y., has had prepared copies of a handy map of Europe, showing the scenes of the great war activities. Copies are being sent to patrons of the firm. The company is also prepared to supply gratis to the fixture trade a special Fluto tool which is a great convenience in attaching Fluto sockets in fixtures with links.

**Reeves & Skinner Machinery Company,** St. Louis, Mo., has issued catalog and price list No. 2 of its boiler-feed pumps. These are made both as reciprocating and as centrifugal pumps and are suited for a variety of pressures. The catalog is illustrated with many views of various types of this machinery and gives complete data and other useful information respecting pumps.

**Western Electric Company,** New York City, has issued an attractive little booklet entitled "Sunny Monday." This sets forth the way in which the old-fashioned "Blue Monday" has been converted into "Sunny Monday" by means of the Western Electric washer and wringer. The bulletin is well illustrated and points out the ease of oper-

ation and other advantages of this machine.

**Condensite Company of America,** Glen Ridge, N. J., has issued an interesting booklet describing the properties of Condensite as a molded electrical insulating material. The composition of this synthetic chemical product is described and its adaptability to electrical purposes clearly set forth. The booklet is well illustrated with many views of products molded from this material.

**The Whitney Manufacturing Company,** Hartford, Conn., has issued a new catalog of roller chains, block chains and silent-type chains for motor vehicles. Illustrations are given of a number of views in the manufacturing establishment of the company and of various types of chains of the classification mentioned. Some interesting information is also included on the care and lubrication of driving chains, roller chains and sprockets.

**Duncan Electric Manufacturing Company,** La Fayette, Ind., is enjoying a constantly increasing demand for its meters and transformers. More Duncan meters are being shipped now than at this time last year, while in the transformer department the company is several weeks behind in its orders. The company has again been obliged to increase its factory facilities and is now remodeling a building adjoining its factory into which the offices will soon be moved.

**Kuhlman Electric Company,** Elkhart, Ind., has received an order from the Municipal Electric Light Department of the City of Cleveland, O., for the following transformers: Four, 40, eight 50; six 75, and four 100- kilowatt single-phase transformers, and five each of 75, 10, 15, 25, 50, 75 and 100 kilowatt three-phase transformers. The city reserves the right to increase the order one-third. The above order aggregates over 3,000 kilowatt and delivery is to be made in 60 days.

**Benjamin Electric Manufacturing Company,** Chicago, Ill., has issued a special pamphlet devoted to the fixtures it has recently placed on the market for gas-filled tungsten lamps. About 20 fixtures specially designed for these high-power lamps are illustrated. They include both bracket and ceiling fixtures for various methods of mounting, also indirect and angle fixtures. Each unit has either a reflector or diffusing globe or both. A number of Mogul-base sockets are also listed.

**Lovell - McConnell Manufacturing Company,** Newark, N. J., has issued a very attractive catalog of Klaxon electric warning signals. These are made in a great variety of types suitable both for automobiles and motor boats. The construction of the devices is carefully described with the aid of numerous illustrations showing the equipment and its parts in several styles, including the Klaxonet and the Klaxet. Separate leaflets have also been issued by the company describing each of these signals.

**Manhattan Electrical Supply Company,** 17 Park Place, New York, N. Y., has a new illustrated catalog and price list of Mesco products. The catalog comprises 267 pages and includes an exceptionally great variety of electrical supplies of all kinds that this company handles, among which are telegraph and telephone apparatus, bells, buzzers, annunciators, batteries, speaking tubes, electric-light attachments, medical apparatus, electric heating appliances, electric toys, fan motors, wiring devices and specialties, instruments, etc.

**The Dayton Engineering Laboratories Company,** Dayton, O., has issued a special number of its house organ "Delco," this being the issue of August 8. This was specially well illustrated and included as an insert a map showing the territory of the Delco traveling service representatives. A large size schematic diagram of the Delco equipment was included, which gives a very good idea of the general arrangement and connections of the outfit. An account with many illustrations is given of the outing held at Dayton on Delco Day, July 25.

**Titan Storage Battery Company,** Chapel Street and Lister Avenue, Newark, N. J., has issued a well illustrated bulletin describing in detail the construction and characteristics of the various types of Titan storage batteries. These are made for electric vehicles, both of the pleasure and commercial types, for lighting and ignition systems on gasoline automobiles and for use with self-starting outfits thereof. The bulletin gives an account of the organization of the company and points out its excellent manufacturing facilities for producing high-grade batteries. The illustrations of the different types of cells and parts thereof are exceptionally fine; the views of the plates are colored to correspond very closely to the natural colors of the sponge-lead negative and lead-peroxide positive plates.

**The Westinghouse Electric & Manufacturing Company,** East Pittsburgh, Pa., announces the adoption by the **American La France Fire Engine Company,** Elmira, N. Y., of the Westinghouse Electric Automobile Equipment for fire trucks manufactured by this company. This equipment consists of starting, lighting and ignition apparatus for motor trucks used in connection with fire department work. Singer Motor Company, Incorporated, Long Island City, N. Y., has adopted the Westinghouse electric starting and lighting system for its 1915 cars. This equipment consists of starting motor and lighting generator with the complete equipment of switches, fuse blocks and voltmeters. McFarlan Motor Car Company, Connersville, Ind.; Vulcan Manufacturing Company, Plainville, O.; Speedwell Motor Company, Dayton, O.; Briggs-Detroiter Company, Detroit, Mich.; Stewart Motor Corporation have adopted for their 1915 cars the Westinghouse starting, lighting and ignition system. The Kissell Motor Car Company, Hartford, Conn., has adopted the Westinghouse ignition and lighting system for its 1915 cars. The Westinghouse company has recently issued under the title "Advertising that Helps You Sell," a bound collection of advertisements placed in popular magazines by the company. The pamphlet includes advertisements of domestic and industrial applications of electricity which have been placed by the company in the various magazines. The pamphlet is being distributed to central stations and dealers to inform them of the service furnished by the company. The twentieth number of its monthly publication, entitled *Small Motors,* has also recently been issued. This publication considers the numerous applications to which small motors are adapted and the fields in which they will meet with ready sales.

## PATENTS.

Owing to exceptional delay in sending out the August 11 issue of *The Official Gazette* of the United States Patent Office, which has not yet been received at the time of going to press, our usual record of the electrical patents issued on the above date will be published in our next issue.

### Patents Expired.

The following United States electrical patents expired August 17, 1914:

588,144. Electric Trolley Device. S. Harris, Johnstown, Pa.

588,145. Electric Trolley Device and Conductor Construction Therefor. S. Harris.

588,170. Method of and Apparatus for Multiple Rate-Metering for Electric Currents. E. Oxley, Washington.

588,188. Electric Contact Device. D. S. Shallenberger, Johnstown, Pa.

588,189. Accumulator Battery. J. V. Sherrin and H. H. Sherrin, London.

588,206. Protective Appliance for Electrical Apparatus. A. S. Williams, Newton, Mass.

588,233. Carbon-Holder for Electric Lights. O. S. Moss, Syracuse, N. Y.

588,246. Combination Volt-Graduator. W. J. Shields, New Wilmington, Pa.

588,251. Recording Instrument. W. Thomson, Largs, Scotland.

588,258. Switchboard Apparatus. W. F. Banks, Milford, Conn.

588,266. Treatment of Phosphates. G. De Chalmot, Leaksville, N. C.

588,267. Electric Furnace. G. De Chalmot.

588,279. Direct-Current Generator. B. G. Lamme, Pittsburgh, Pa.

588,320. Lightning Arrester. C. C. Chesney, Pittsfield, Mass.

588,382. Electrical Conductor. J. D. Bishop, New York, N. Y.

588,391. Electric-Motor-Car Truck. G. M. Brill and J. A. Brill, Philadelphia, Pa.

588,396. Electric-Railway System. J. Claret and O. Vuilleumier, Paris, France.

588,399. Electric Fire-Engine. G. W. Cox, Stuart, Iowa.

588,435. Rail-Bond for Electric Railroads. V. E. Hunter, Cleburne, Tex.

588,479. Electric Herb Pad. A. Roedel, New York, N. Y.

588,480. Magnetic-Switch Lock. S. H. Short, Cleveland O.

588,490. Brush-Holder Support for Electric Generators or Motors. S. H. Short.

588,491. Multipolar Dynamo, Motor, or Rotary Transformer. S. H. Short.

588,511. Transmitter. A. Van Wagener, Sioux City, Iowa.

588,528. Electric Railway. R. M. Hunter, Philadelphia, Pa.

588,541. Current-Conducting Rail for Electric Railways. L. E. Walkins, Springfield, Mass.

Reissue. 11,626. Electric Burglar-Alarm. C. Coleman, Chicago, Ill.